REFERENCE FILE

Spreckels SUGAR BEET Bulletin

VOLUME VIII 1944

ISSUED BY SPRECKELS SUGAR COMPANY . . . ESTABLISHED 1897

AGRICULTURAL DEPARTMENT — SPRECKELS SUGAR COMPANY

Addresses and Telephone Numbers

NAME	TITLE	ADDRESS	TELEPHONE
J. E. Coke	*General Agriculturist*	*Two Pine Street, San Francisco*	*DOuglas 5600*
B. H. Benidt	*Special Assistant*	*Two Pine Street, San Francisco*	*DOuglas 5600*

DISTRICT 1

SALINAS DISTRICT

C. L. Pioda	*Resident Manager*	*Spreckels Sugar Co., Spreckels*	*Salinas 7321*
G. P. Wright	*District Manager*	" " " "	" "
W. H. Paulsen	*Agricultural Superintendent*	" " " "	" "
C. E. Crane	*Agricultural Superintendent*	" " " "	" "
Ralph Lambdin	*Asst. Agr. Superintendent*	" " " "	" "
G. C. McCandless	*Field Superintendent*	" " " "	" "
Glen McDougall	*Field Superintendent*	" " " "	" "
W. B. Marcum	*Field Superintendent*	" " " "	" "
F. R. Behringer	*Labor Superintendent*	" " " "	" "
J. B. Larsen	*Field Superintendent*	*P. O. Box 87. King City*	*King City 72-F2*

DISTRICT 2

SACRAMENTO DISTRICT

H. F. Melvin	*District Manager*	*600 California Fruit Bldg., Sacramento*	*3-2021*
W. C. Waterman	*Agricultural Superintendent*	" " " " "	"
Guy D. Manuel	*Asst. Agricultural Superintendent*	" " " " "	"
A. L. Knudsen	*Labor Superintendent*	" " " " "	"
E. A. Schwing	*Entomologist*	" " " " "	"
Austin A. Armer	*Agricultural Engineer*	" " " " "	"
P. T. Rezner	*Field Superintendent*	" " " " "	"
A. H. Kaas	*Field Superintendent*	" " " " "	"
Harold H. Voth	*Field Superintendent*	" " " " "	"
G. W. Zellinger	*Field Superintendent*	" " " " "	"
Dan Burr	*Field Superintendent*	*Spreckels Sugar Co., Walnut Grove*	*Walnut Grove 2646*
R. D. Jones	*Livestock Specialist*	*Spreckels Sugar Co., Woodland*	*Woodland 1060*
H. T. Carlson	*Asst. Agricultural Superintendent*	" " " "	" "
J. C. Larsen	*Field Superintendent*	" " " "	" "
R. L. Merchant	*Field Superintendent*	" " " "	" "
H. J. Venning, Jr.	*Field Superintendent*	" " " "	" "
C. W. Patrie	*Field Superintendent*	" " " "	" "

Spreckels SUGAR BEET Bulletin

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

Vol. VIII JANUARY-FEBRUARY 1944 No. 1

SPRECKELS ORDERS MARION HARVESTERS

EIGHT 2-ROW HARVESTERS ORDERED FOR 1944 CROP

The Spreckels Sugar Company has ordered from the Blackwelder Iron Works of Rio Vista eight 2-row Marion harvesters to be used in the harvesting of sugar beets in 1944. These eight machines are in addition to the four single row Marion harvesters purchased and used in 1943 and which are now being modernized so they will have all the improvements that were found to be desirable in their 1943 operation.

The Marion harvester is the only machine that has found commercial acceptance, which lifts, tops and delivers clean beets to the truck in one operation without supplemental hand labor.

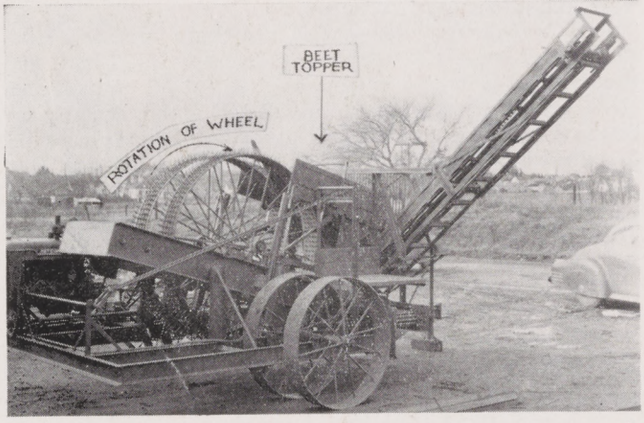


Fig. 1.—The two-row Marion harvester can harvest close to 1 acre of beets per hour if pulled with a tractor of adequate power. Thus with two men (a tractor driver and a machine operator) it can deliver into trucks 144 tons of clean, topped beets per day (8 hours) working in fields averaging approximately 18 tons per acre.

Lifting of the beets is accomplished by a double shank (standard) plow (see A, Figure 2). Forward from the lifting shank are two standards (see B, Figure 2) used to loosen the soil in order to lift the beets with greater ease.

The plow frame also carries two spike-studded wheels, which spike the loosened beets through the leaves and crowns. These beets are held firmly to the rim of the wheel by the spikes and are carried upward to the topper by the rotation of the wheel.

The beets are topped by a series of fixed chisels (see A, Figure 3), which are located as shown in Figure 1 and which slice the beets from the crowns wedging the beets off the spikes as the wheel rotates. Stems adhering to the topped beets after they slide over the chisels are clipped by means of an oscillating sickle bar (see B, Figure 3). The beets then fall onto a shaker screen which removes adhering dirt and are delivered to an elevator which car-

(Continued on next page)

PLAN PLANTING FOR MECHANICAL HARVEST

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

The 1943 harvest season made history by the great strides made in mechanical harvesting of sugar beets. Over 4,000 acres of California beets were harvested by machine—a very real achievement.

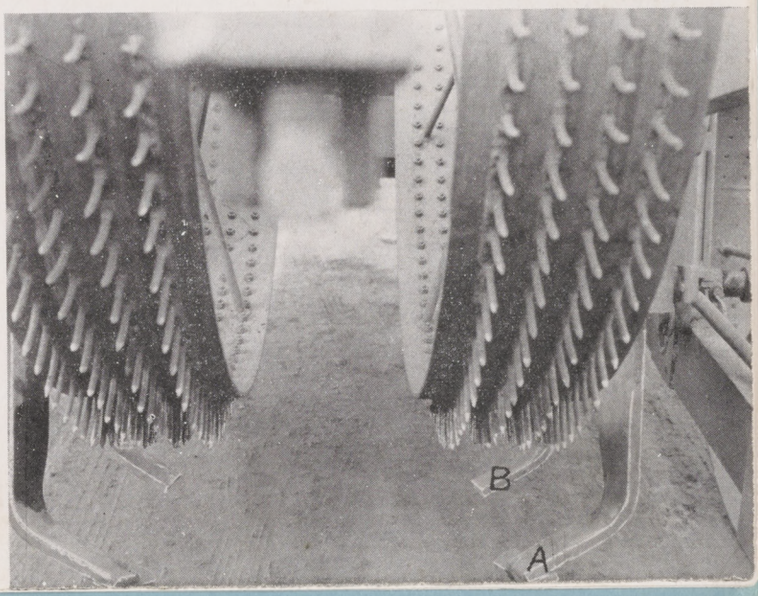
The 1944 season will undoubtedly see a marked increase in the use of harvesting machinery. The forward-looking grower, realizing the probability of harvesting beets mechanically, will make use of such planting, thinning, and growing practices as will best fit the mechanical harvest program.

Valuable experience with mechanical harvest was gained during the past season. The shortcomings as well as the virtues of several harvesting systems were noted. In many cases of indifferent or unsatisfactory machine performance, the fault lay in the field practices used in growing the crop. Where machine performance was at its best, the field conditions were good. These conditions were never accidental. For the most part they were good standard conditions, the kind which every grower would like to achieve whether his beets were to be harvested mechanically or by hand. These conditions are discussed herewith, so that harvest difficulties may be minimized and good yields realized.

1. *Uniform Stand.* Even stands, free from skips, were the exception rather than the rule in California in 1943. Skips were not necessarily the fault of labor or supervision; natural causes may have been to blame. But evenly

(Continued on next page)

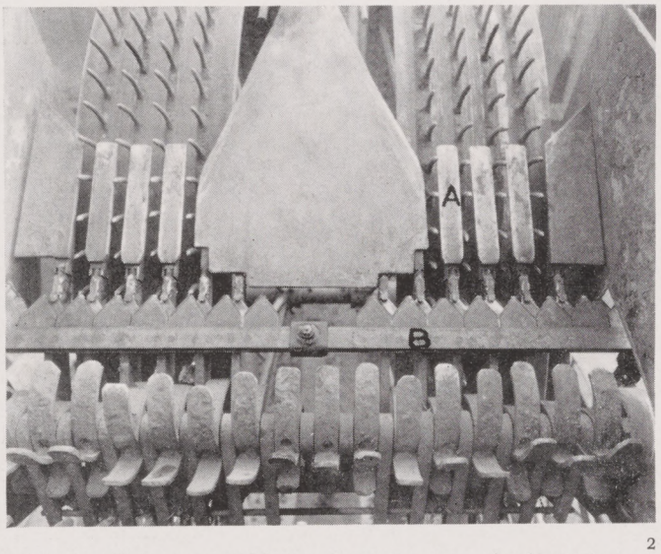
Fig. 2.—The two-row Marion sugar beet harvester lifts the beets by a double shank plow (see A). Forward from the lifting shank are two standards (see B) used to loosen the soil in order to lift the beets with greater ease. Two spike-studded wheels spike the loosened beets through the leaves and crowns. These beets are held firmly to the rim of the wheel by the spikes and are carried upward to the topper by the rotation of the wheel.



MARION HARVESTERS *(Continued from preceding page)*

ries them to a truck. The tops and crowns which remain on the spikes while the beets are being topped pass under the chisels and are stripped from the spikes, falling onto a cross-conveyor, where they are windrowed.

Power for the elevator, shaker screen, top conveyor and hydraulic plow lift is supplied by a small 4-cylinder gasoline engine mounted at the rear of the machine.



2

Fig. 3.—The two-row Marion harvester tops the beets by a series of fixed chisels (A) which slice the beets from the crowns, wedging the beets off the spikes as the wheel rotates. Stems adhering to the topped beets after they slide over the chisels are clipped by means of an oscillating sickle bar (B).

The harvesting rate of the machine is dependent upon its forward speed so that ample power must be provided in order to accomplish economical and rapid harvest. The most suitable tractor is a tracklayer having a tread width of about 40 inches and narrow shoes which fully clear the beet rows. A tread width of 60 inches can be used, but the resulting side draft is undesirable. Generally speaking, the more power, the better. Such tractors as the TD40, TD14, D6 or D7 should be used.

3

Fig. 4.—Beets are spiked through the leaves and crowns by the Marion harvester and adhere firmly to the rim of the wheel by the spikes as they are carried upward to the topper by the rotation of the wheel.

The hourly capacity of the 2-row Marion Harvester with one of these tractors is close to one acre. Thus, with an 18-ton yield and a daily operating time of 8 hours, the harvester should deliver 144 tons of clean, topped beets per day. The labor cost is extremely low, since the entire harvesting job requires only one tractor driver and one machine operator. For continuous operation of the harvester, three trucks are required. On extremely long hauls, an additional truck is necessary.

PLAN PLANTING *(Continued from preceding page)*

spaced stands of 100 to 120 beets per 100 feet of row were a great help to mechanical harvest, since beets were uniform in size and top growth. This resulted in good topping quality, low tare and freedom from breakage.

2. *Freedom from Weeds.* Morning Glory, Kelp, Water Grass, Mallow, and Pigweed were the chief weeds causing trouble with harvesting machines. Occasional weeds gave no trouble, but the equipment was slowed down in proportion to the density of weeds. Some fields were so badly infested with water grass that mechanical harvest was impossible.

3. *Early Planting.* Some trouble was experienced with late plantings, where top growth was very large and fresh. Early plantings had more dried foliage, and the green foliage was less fleshy and bulky, which resulted in good topping quality and low tare.

4. *Row Spacing.* Present harvesting machines lend themselves best to 20-inch flat plantings; 18-22-inch flat plantings were nearly as satisfactory, but 16-24-inch and 14-26-inch plantings were difficult to handle. It is by no means recommended that odd spacing or bed planting be abandoned in contemplation of mechanical harvest. But certain growers, accustomed to 14-16-inch or 16-24-inch flat planting might readily change to 20-inch even spacing should other important cultural practices not be affected by such a change. Accurate "guess rows" are important to good mechanical harvest, and the space between a pair of four or six row drills should be checked to make sure that it is the same as the space between individual openers.

MISCELLANY . . .

BEET BULLETIN: To conserve manpower, six rather than twelve issues of the Spreckels Sugar Beet Bulletin will be published in 1944. Recently we selected at random a group of names of people receiving the Bulletin. We asked them if they read the publication and if they did, what could be done to improve it. We might be accused of boasting if we reported the results of the survey. However, we are determined not to let down in our effort to improve the publication. Many helpful suggestions were received. The door is always open for suggestions; they are greatly appreciated as we would like to have the Bulletin as useful as possible.

* * *

LABOR: Spreckels Sugar Company has again applied for Mexican National field labor, which will be made available to growers having beet contracts. Certification by the Agricultural Extension Service for the labor requested has been received and it is anticipated that the program will move along about as it did in 1943. There has been some delay in Washington in the enactment of the bill providing money for the recruitment and distribution of the Mexican Nationals. It is expected, however, that this matter will soon be clarified and that recruitment of Mexican Nationals will shortly be under way.

MISCELLANY (Continued from preceding page)

The Government is requiring one important change in the 1944 labor program. The contract requires the employer to provide free board for all work days the laborer is willing, but does not work. In 1943 the Government paid the board of a worker for the days he did not work, but was willing to do so.

* * *

SUGAR LEGISLATION: The latest word from Washington indicates that no announcement of a Government sugar beet support program for 1944, as well as support payments for other crops, will be made until the fight over subsidies in Congress is completed.

This Company's 1944 Sugar Beet Contract, which assures a price for beets equal to that received in 1943, at least gives growers something to go on until the government announces its 1944 program. Of course, the grower will be at a disadvantage until he knows more about possible returns from all crops.

J. E. Coke

January 17, 1944 *General Agriculturist*

KEEP SEED CLEAN IN YOUR PLANTER

By A. E. BOTSFORD, *Sales Promotion Manager*
John Deere Plow Company

Much has been written about the advantages of using segmented seed, but to obtain these advantages, comparatively light seeding rates must be used. Quite naturally, if 2½ to 6 pounds of seed are to be planted to the acre, more care must be used than if 15 to 18 pounds are planted. Lighter rates should most certainly be the ultimate goal of every grower with the thought in mind that thinning expense can be considerably reduced, and, to date, the plate type planter appears best for these lighter seeding rates.

Due to physical characteristics of beet seed, whether whole or segmented, handling of the seed tends to break off small particles. In addition, when an exact amount is metered through the planter, quite often the cell of the plate will contain a smaller seed ball plus a second seed with a considerable part of the latter above the top of the seed plate. This is inevitable with screening of seed allowing a tolerance of 3/64-inch.

Two alternatives are possible in present construction of plate planters; either design the cut-off to shear off such part of the seed ball as extends above top of plate, or design the cut-off to permit the excess seed to pass. Plate planters of present design mostly use the first method in order to obtain accurate seeding rates, and this too increases the amount of dust and broken particles collecting in bottom of seed can.

As the hopper is being continually refilled, the accumulation of dust and broken seed balls can easily increase to such a point that accurate seeding in light amounts can be materially affected. To correct this condition, it is very good practice to empty each seed hopper before refilling, and clean out dust that may accumulate between plate and hopper bottom. To prevent loss of good seed, a small box about 12″ square and 6″ deep, with wire "fly screen" tacked to the bottom should be carried with the supply of seed. As each hopper is ready to be refilled, empty it into the screened bottom box, shake a few times to screen out dust and small broken particles of seed and then put remaining clean seed back in hopper and refill.

Farming of all kinds is becoming a highly specialized business and there is but a small margin between success and failure. A few minutes care in planting the crop can result in the saving of many man hours of labor in thinning and will prove most profitable for the grower.

GROWERS USE SEGMENTED SEED

By R. S. LAMBDIN *and* GUY D. MANUEL
Assistant Agricultural Superintendents
Spreckels Sugar Company

During the past season segmented seed was used to plant 70 per cent of the sugar beet acreage grown for the Spreckels Sugar Company in Monterey, San Benito, Santa Clara, and Santa Cruz counties and 60 per cent of the acreage in the Sacramento and San Joaquin Valleys. In the coastal area, the average amount of segmented seed used per acre for planting was 5.4 pounds per acre, while for the acreage planted to whole seed 15.1 pounds per acre was used. In the Sacramento and San Joaquin valley areas an average of 6 pounds of segmented seed was used per acre.

4

Stand from segmented seed planted at the rate of 3 pounds per acre. Thinning with long handled hoes. Grower—M. F. West, Tracy, California. 1943.

SEGMENTED SEED RESULTS IN COASTAL AREA

Field observations made during 1943 showed no significant difference in the growth of the crop when planted with whole seed as compared with segmented seed. The field germination of the segmented seed and the resulting stands were satisfactory. No more difficulty was experienced in securing stands with segmented seed than is normally experienced with whole seed.

It is anticipated there will be a considerable increase in the acreage planted to segmented seed in this area in 1944.

(Continued on next page)

SEGMENTED SEED *(Continued from preceding page)*

SACRAMENTO AND SAN JOAQUIN VALLEY AREA

Early plantings of segmented seed gave good stands and although there were too many plants in the row to avoid any appreciable saving in labor, these fields were definitely favored by laborers and were the ones thinned first. Weather conditions were very unsatisfactory for field germination of seed during the latter part of the planting season, hence some growers questioned the use of segmented seed under any conditions. The dry winds that prevailed during that period forced growers to plant seed deeply in order to place the seed in moist ground and although much trouble in securing stands was experienced with whole seed, it appeared to come through better when planted deeply than did the segmented seed.

5
Stand from segmented seed planted at the rate of 3 pounds per acre.
Grower—M. F. West, Tracy.

Studies indicated that the percentage of the seed units which produced plants was almost as high with segmented as with whole seed.

The distribution of the segmented seed left much to be desired and made the use of cross-blocking or the Dixie Blocker inadvisable in many cases.

Where stands were uniform they were generally too thick and even though mechanically blocked, it was necessary to thin them with short handled hoes. In lighter stands the many clumps and skips which occurred in the row made blocking too hazardous.

Laborers in all districts very decidedly favored thinning fields planted with segmented seed, but did not like to thin following mechanical blocking.

Better regulation of drills will do much to promote more uniform spacing of plants in the row, thus making it more feasible to use mechanical blocking.

A few growers, who planted from 2 to 4 pounds of segmented seed per acre, were able to use long handled hoes and although the costs were as great as for hand thinning, this operation cleaned out the weeds and saved the first hoeing costs. Stands from segmented seed had much less set back from thinning than those from whole seed.

Many growers feel that the use of segmented seed forces workers to do a better job of thinning and results in leaving more singles and the plant less disturbed than from the use of whole seed.

1943 SUGAR BEET GROWER HONOR ROLL

YIELDS IN EXCESS OF 25 TONS OF BEETS PER ACRE ARE LISTED BELOW FOR VARIOUS ACREAGES UNDER CONTRACT WITH THE SPRECKELS SUGAR COMPANY.

MR AVERAGE CALIF. GROWER 15.4 TONS		SEED TYPE USED
IRVIN DETHLEFSEN	35.33 TONS	SEGMENTED
PETER & ARNOLD BRESCHINI	33.65 TONS	SEGMENTED
IRVIN DETHLEFSEN	32.15 TONS	SEGMENTED
O. O. EATON	31.53 TONS	WHOLE
HAZEL M. BETTS	30.66 TONS	SEGMENTED
ROSS NISSEN RANCH	30.23 TONS	SEGMENTED
THOS. NUNES, JR.	29.42 TONS	SEGMENTED
Q. L. GERHART	29.05 TONS	SEGMENTED
SALINAS VALLEY VEG. EXC.	28.55 TONS	SEGMENTED
JOHN R. BREEN	28.20 TONS	SEGMENTED
LAWRENCE BRICKEY	28.13 TONS	SEGMENTED
S. J. GALLAGHER	27.98 TONS	SEGMENTED
FRANK F. MINHOTO	27.22 TONS	SEGMENTED
W. J. SCHWEEN & SON	27.13 TONS	SEGMENTED
P. M. RESETAR CO.	27.03 TONS	WHOLE
GUS LUEDDEKE	26.95 TONS	SEGMENTED
GARNET W. HERBERT	26.92 TONS	SEGMENTED
T. H. HOLTHOUSE	26.87 TONS	SEGMENTED
PAUL B. TAVERNETTI	26.82 TONS	SEGMENTED
GOMES & REED	26.69 TONS	SEGMENTED
PAUL B. TAVERNETTI	26.69 TONS	SEGMENTED
OLIVER C. BARDIN	26.62 TONS	SEGMENTED
BEN BAUER	26.45 TONS	SEGMENTED
MARY F. & E. E. NUTTING	26.09 TONS	SEGMENTED
PETERSEN BROS.	25.96 TONS	SEGMENTED
JOHN RASMUSSEN	25.65 TONS	SEGMENTED
A. & V. VOSTI	25.51 TONS	SEGMENTED
BOTELHO BROS.	25.42 TONS	WHOLE
ARTHUR T. HIMMAH	25.41 TONS	SEGMENTED
O. O. EATON	25.34 TONS	WHOLE
EARL WILSON	25.04 TONS	SEGMENTED
H. T. DODDS	25.01 TONS	SEGMENTED

NOTES FROM MY FIELDBOOK

Repair beet drills before planting begins to avoid breakdown which occurred last year.

* * *

Lubricate drills before and while planting to save wear on working parts and for better operation of drill.

* * *

Last year forgot to clean dirt and cobwebs from seed tubes and had to replant portion of field---clean tubes now.

Seed boxes and cans of drill to be thoroughly cleaned before planting starts and at frequent intervals during season; removal of dust, broken seed and trash will make possible a better job of planting than last year's.

* * *

Be sure to calibrate each unit of drill for rate of planting by tying paper bags on each seed spout and weighing seed delivered. Planting depth for each drill unit should also be checked.

* * *

Seed treatment is good insurance. Use 1-1½ pounds of 2% Ceresan per 100 pounds of seed whether using sheared or whole seed. Refer to May 1941 issue of Spreckels Sugar Beet Bulletin for construction plan of seed treater which can be used to mix fungicidal dust thoroughly with the seed.

This equipment makes it easy to treat seed in small lots so that no treated seed will be stored more than a day or two.

BUY WAR BONDS!

PROGRESS IN WEED CONTROL

By T. W. THWAITS, *Assistant Farm Advisor*
Monterey County, California

During these times of manpower shortage, farmers are looking for labor-saving devices and methods that will make it possible to obtain maximum production with a minimum amount of labor. The job of weeding crops has always taken a great deal of hand labor, but by improved planting methods, it is possible to cultivate between the rows of the growing crops and eliminate the majority of weeds; however, there is always that area which is in the crop row that requires hand weeding.

Within the last few years, methods have been developed that partially eliminate weeds within the crop rows of certain crops. These developments can be credited both to scientific research and farmers' ingenuity. The two methods now being used are spraying and burning.

6

Figure 1.—Spray machine used for either stove oil or Sinox. Constructed by the Premier Produce Co. of Salinas.

7

Figure 2.—Onions sprayed with Sinox. (Sprayed on the left and unsprayed on the right.)

SPRAYING WITH STOVE OIL

Certain spray materials can be used because various plants show a resistance to them. This resistance may be due to either or all of the following factors: (a) natural resistance; (b) plants such as onions, garlic, grasses, cereals and flax being not easily wetted; (c) the growing points being protected by enfolding leaves.

The first crop to be weeded on a large scale by a chemical spray was carrots, which were found to be resistant to stove oil. Thousands of gallons of this material are used each year to spray carrot fields and thus eliminate the weeds, as well as to save a considerable amount of labor.

At first a mixture of stove oil and water was used. This material was applied at very high pressures (about 600 pounds) which was necessary in order to put out a large volume of spray so that a considerable acreage could be covered in a day. It has since been found that straight stove oil can be used and pressures as low as 250 pounds will give good results. The average pressure developed by the spray rig is 400 pounds. By this method, less liquid per acre is applied and as a result the liquid in a 400-gallon spray tank will cover twice the acreage that it formerly did. (Figure 1.)

The oil is applied to the beds only, at the rate of approximately 40 to 60 gallons per acre. Carrots are sprayed when they have from one to three true leaves, but they can be sprayed when they are more mature without any injury to them; however, late applications of oil will flavor the carrots and as a result they will be unmarketable. The application of an excess of oil may also flavor the carrots.

(Continued on next page)

WEED CONTROL

(Continued from preceding page)

During the past year, stove oil was also applied to a number of celery beds in the Salinas Valley in order to eliminate weeds without any injury resulting to the celery plants. At the time of spraying, the celery plants must have at least one true leaf. In one instance, celery was sprayed with stove oil after transplanting. No injury was noticed on the plants; however, the oil flavor is still present. At the time of writing this article, it appears doubtful that it will be dissipated. Considerably more information is needed in regard to the use of stove oil on celery.

Parsley is another crop that shows a resistance to stove oil. The cost of this work under present methods is from $8.00 to $9.00 per acre.

SPRAYING WITH SINOX (Sodium Dinitro-ortho-cresylate)

Sinox, another chemical being used for weed control, is a yellow dye stuff derived from coal tar which is dissolved in water. One gallon of Sinox can be added to anywhere from 45 to 100 gallons of water, the usual mixture being one gallon of Sinox to 60 gallons of water, and to this is added one pound of ammonium sulfate. Under most conditions, 60 gallons of this solution are applied to the acre. Pressures in the spray rig may vary from 80 to 125 pounds.

The strength of the solution, the quantity applied per acre, and the pressure at which it is applied may vary. *Experience* alone is the way in which to determine the proper method under a certain set of conditions.

Onions and garlic, the most common row crops on which this chemical is used for weed control, are resistant to Sinox because the leaves are not easily wetted and because of the waxy coating on the leaves. (Figure 2.) They should not be sprayed unless they have one or more true leaves and provided there is no dew or moisture on the leaves of the young onion plants. Peas can also be sprayed.

Sinox is less efficient than stove oil as a weed killer because many weeds are resistant to the effects of Sinox. The cost per acre is about the same as with stove oil.

Figure 3.—Weed burner in use.

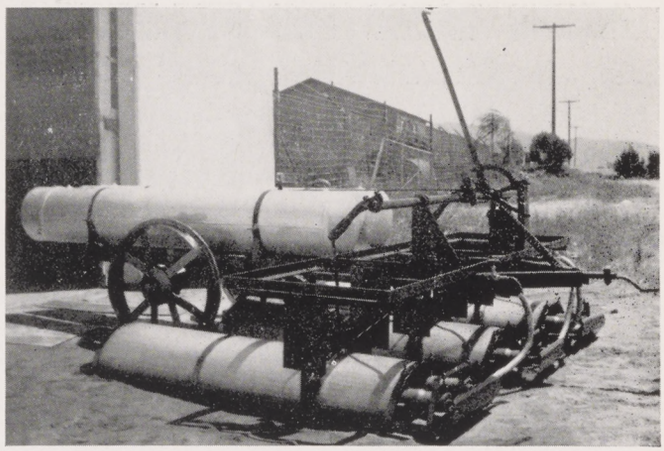


Figure 4.—Weed burner, using Butane gas, developed by O. T. Barrett of Salinas.

BURNING FOR WEED CONTROL

Fire as a medium for weed control on celery beds has been used in the Salinas Valley as well as other places for several years. It is possible to use this method because of the fact that the majority of the weeds germinate and are present on the seed beds several days in advance of the time that the celery has sprouted. (Figure 3.) By burning before the celery appears the majority of the weed growth is destroyed.

Originally either a blow torch or a hand weed burner was used; however, mechanical weed burners have now been developed that will cover from two to four beds at a time and are pulled by a tractor. (Figure 4.) Burners have also been invented that can be used on woody plants such as cotton. The flame is applied to weeds growing in the cotton rows without injury to the plants. Weed control by burning may be possible with crops other than those mentioned, particularly those that are slow germinating or have a bulbous root that would make it possible for the crop to recover after being burned down. Onions are an example of this type of crop and in some districts this method has been a practical means of controlling weeds in onion fields. More information is needed on this subject. It is one that the average farmer can experiment with himself.

Unfortunately, the number of crops that can be sprayed or burned for weed control are limited. Plants such as sugar beets, lettuce, broccoli, cabbage, and the like are not resistant to chemical weed sprays nor can they be burned successfully. Possibly some other method may be developed.

Those interested in spraying or burning their crops for weed control and who have not had any experience in this subject should contact their Farm Advisor, Agricultural Commissioner, or some other recognized authority on this subject.

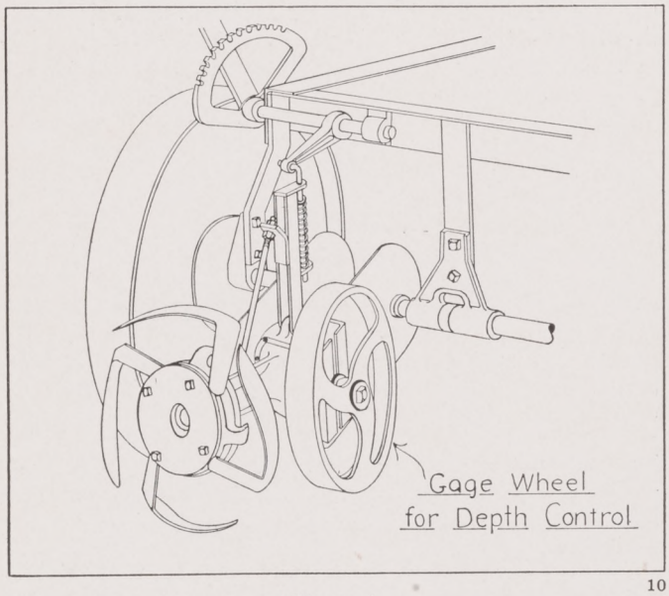
Bulletins and circulars on these subjects have been published by the University of California and are available for those interested.

DIXIE BEET BLOCKER TO BE IMPROVED

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

Trials during the 1943 thinning season showed the necessity of two major modifications on the Dixie Beet Blocker.

The first was the addition of gage wheels (see Figure 1), which accurately determine the depth of cut for each cutting head.

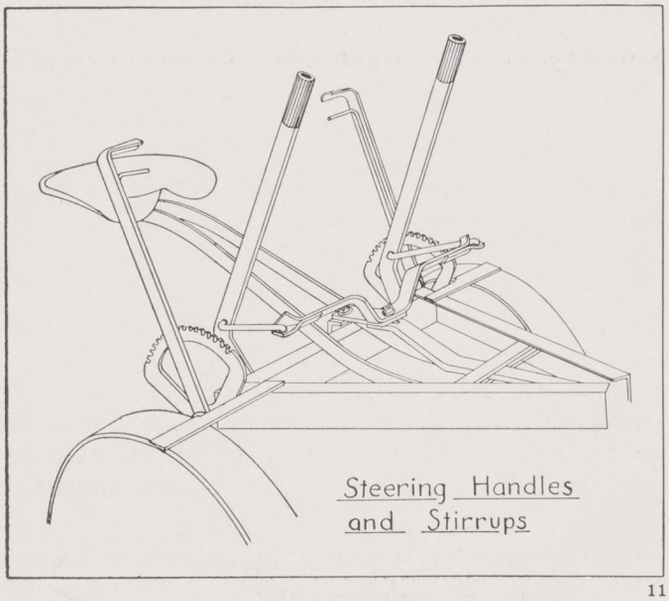


10

Figure 1.

The second was the addition of hand levers with high leverage on the steering mechanism (see Figure 2). These greatly reduced the effort of steering and helped in keeping the cutting heads on the row.

It is planned to incorporate these improvements in the Dixie Blockers supplied by the Spreckels Sugar Company for the 1944 season.



11

Figure 2.

BEET SEED GROWING IN WEST IS ESTABLISHED INDUSTRY

By SAM C. CAMPBELL, *Manager*
West Coast Beet Seed Company

The production of sugar beet seed by the over-wintering method began with a small commercial planting in the Mesilla Valley, New Mexico in 1927. During the following 15 years, the industry expanded rapidly to several other states including California, Arizona, Utah, Oregon, Washington and Nevada.

In 1932 a total of 412 acres of seed was grown, producing 550,000 pounds. Since that time acreage and production increased steadily so that by 1941, the peak year to date, 10,000 acres were harvested in 12 states with production over 18,000,000 pounds.

12

Beets planted for seed in September go through the winter with considerable top growth. The seed is harvested 12 to 14 months after planting.

Following the initial success of the industry, the beet sugar companies began to organize seed companies for the purpose of handling their seed growing operations. The West Coast Beet Seed Company was organized in 1940 after operating the previous five years under the name of West Coast Beet Seed Committee.

Early experimental plantings were conducted by the company in many localities of the western states, but operations are now confined only to a few districts in California, Oregon and Washington. In California extensive seed growing areas include the Hemet-San Jacinto Valley in Riverside County, Shasta Valley in Siskiyou County, and along the South Fork of the Pitt River in Modoc County. Oregon seed growing operations are carried on in the Willamette Valley in northwestern Oregon and in the Medford and Klamath Falls areas of southern Oregon. A small amount of seed is being grown near Mt. Vernon, Washington, in Skagit County.

During the period between 1935 and 1940 West Coast Beet Seed Company produced approximately 25 per cent of the country's total seed output, and in 1941 and 1942 this figure increased to over 35 per cent. Final production

(Continued on next page)

BEET SEED *(Continued from preceding page)*

figures are not yet available for 1943, but we estimate this company's production at approximately 6,000,000 pounds as compared with 5,659,624 pounds in 1942 and 6,707,387 pounds in 1941.

The production from the current year's crop will go

13

Field of windrowed seed. Alturas, California, September.

to supply all or a substantial part of the seed requirements of the Spreckels Sugar Company and nine other sugar companies. In addition, some seed is being produced for Great Britain through Lend-Lease.

The company, through its member sugar companies, cooperates closely with the U. S. Department of Agriculture, which is doing much in the way of selection and

14

Threshing seed from windrow with a pickup thresher.

breeding work to improve varieties for disease resistance, quality, resistance to bolting, etc. Seed of these improved varieties is made available to the sugar companies as rapidly as the Elite, or stock seed can be increased on a commercial basis.

BEETS ON NEMATODE INFESTED SOILS

By C. E. CRANE, *Agricultural Superintendent*
Spreckels Sugar Company, Spreckels, California

In certain beet growing districts there is land infested with sugar beet nematode (Heterodera schachtii). Besides the precautions to prevent the spread of this dread enemy, there is the problem of how best to continue growing beets in areas on diseased land.

There is no known field method to entirely free the soil of nematode. Once the land is infected with nematode, it is important to: (1) Prevent its spread to other lands, (2) Establish rotation programs designed to keep nematode population in check.

Rotation is the only known field method of fighting and holding this pest in control. On mildly infested land a satisfactory crop of beets can be grown once in every three to five years; on heavily infested land, once in every five to seven years. In the meantime, crops not attacked by the nematode should be planted and fields should be kept clean of weeds which harbor the pest.

The crops that are not affected by nematode, and which can be used in a rotation, are: cow peas, sweet clover, rye, tomatoes, asparagus, lettuce, cantaloupe, barley, wheat, cucumbers and potatoes.

The following crops harbor the nematode and often, although themselves not seriously affected by the disease, become host plants, thus preventing any reduction

15

Nematode developing in field of beets.

in numbers during the period of growth: alfalfa, beans, garden and sugar beets, cabbage, cauliflower, celery, corn, kholrabi, mustard, parsnips, peas, radishes, rudabaga, spinach, turnips, vetch and sunflowers.

In Europe and in our own Mid-West beet growing areas, lands seriously infested with nematode must be kept out of beet crops entirely until a drastic reduction in numbers has taken place. This is true because the planting season extends through March and April only and the plants are always quite small when the nematode become active.

In California, it is possible to plant beets at almost any time from December 1st to June 1st. With this opportunity of taking advantage of early planting, we can, by careful planning, benefit our crop tremendously by planting on nematode lands at the earliest possible date and giving the plants an opportunity to gain considerable size before the ravages of the pest begin. For best results fertilizer should be applied at planting time, and the crop irrigated at the earliest moment that tests indicate irrigation is necessary. Another light application of fertilizer just before the second irrigation will also help. By this means, at least an average crop of beets may be expected.

Spreckels SUGAR BEET Bulletin

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

Vol. VIII MARCH-APRIL 1944 No. 2

EXPERIENCES WITH MECHANICAL HARVEST

By G. J. REITTER
Meridian, California

This account covers the harvest of two beet fields, using the Zuckerman Topper and side delivery rake, the Killefer Colorado type plow with twisted rods, and the Gaudin loader. The two fields differed so greatly in yield, soil type and weed growth that I believe the machinery was worked under as wide a variety of conditions as is likely to be met.

SUTTER COUNTY BEET FIELD CONTRACT 58-3, 93.25 ACRES

I found the use of the equipment furnished me by the Company on this field very satisfactory. Our ideas on the theory had to be changed slightly to make them practical but in this case, that was not too difficult. The topper worked very satisfactorily and for the first 500 tons delivered, the tare was only 3.43% at the factory.

The plow, while satisfactory, could be improved on. Instead of two bars with the rows staggered, using 8 standards, one bar might be used with only 5 standards.

The raking was done with an ordinary side delivery rake but it was necessary that tops be allowed to dry to reduce the weight. The power-driven rake that you now have works satisfactorily immediately behind the topper.

The loader makes it possible to use unskilled labor and the inexperienced Mexican Nationals have been very satisfactory. You can see that the co-ordination in the field must be well carried out to avoid any lost motion.

My cost on this field was topping, 21.08 cents per ton; raking, 15.48 cents and loading $1.06 or a total of $1.4256 per ton which included rentals of the machinery. This, however, was a good field of beets, making 19 tons per acre and most of the conditions were favorable for this trial. The contract price schedule was $1.35 and was based on 65 cent labor and I had to pay 75 cents, so if the schedule had been adjusted to 75 cents, I believe that I would have been below schedule. Also with the experience, I believe that I could harvest the field over again and save 2 to 5 cents per ton.

COLUSA COUNTY FIELD CONTRACTS 58-13 & 14, 110 ACRES

This field presented a very different picture. This was a very poor crop and any method would have given trouble. The topper worked fairly satisfactorily — the ground was sandy and it was very hard to keep the knives sharp. When they are dull, the topping is not so good.

We finally succeeded in correcting some of the faults in your rake and it is fairly satisfactory even though we had a weed condition, which interfered with its operation. The plow did not work so well in that ground. Probably there were not enough beets, or those that were there were too small and there was a tendency to cover the beets, making them hard to pick up clean. The loader worked with the same satisfaction as in the Sutter County field except much slower due to the poorer yield.

As stated, the equipment has worked out very satisfactorily. However, there is this exception which I consider very important. The equipment must all be working at all times to make it practical. This means proper scheduling of all operations, and the use of enough trucks to maintain continuous loader operation. I was quite fortunate in this respect, but the facts remain and must be considered in the over-all picture of mechanical harvest.

GROWER USES MARION HARVESTER

By CLIFFORD TOTMAN, *President*
California Beet Growers Association, Ltd.

(Editor's Note: Mr. Totman used the first model of the two-row Marion Harvester. This machine was the forerunner of the 1944 model, and many of this machine's features result from Mr. Totman's field experience.)

Just before Christmas I finished harvesting about 550 acres of sugar beets in peat land with the two-row Marion Beet Harvester.

The fact that it is a two-row instead of a one-row does not present any problems except, of course, it takes more power to pull it.

There was quite a bit of development work to be done after we started work, but after the first month it performed beyond my fondest hopes and with the few changes contemplated for 1944, I know it will be as satisfactory in performance as any piece of farm equipment made.

With three 1½ ton trucks on a five mile haul we delivered at the rate of 18 to 20 tons an hour or 150 to 160 tons in eight hours. We had one man on the harvester and were pulling it with an International T.D. 6 which is a 30 H.P. Diesel of about 3½ tons; this tractor was a little light so we put on an International Diesel 35 weighing a little over 5 tons which could pull the harvester at the rate of 3¼ miles per hour. The harvester could be pulled at least 25% faster without over-loading it. In the peat we found it delivered the beets in the truck with less dirt and less tops than with hand loading and it was interesting to note that in hand work we expect about 4% tare, but with this harvester our entire season's work averaged 3.09% tare.

I can't be sure which method leaves the least amount of beets in the field, but I am inclined to believe the harvester does the cleanest work.

The tonnage capacity can best be estimated by multiplying the yield by 8 or 10, which is the number of acres the machine will go over in a day.

I would be pleased to give any other information to anyone interested.

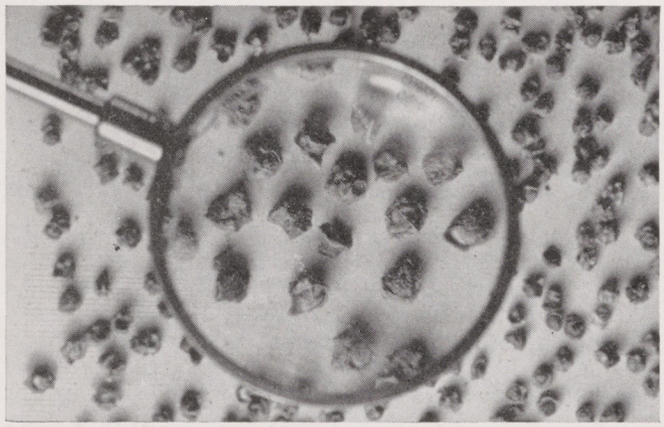
SUGAR BEET MACHINERY—A PICTORIAL REVIEW

A vast amount of development work has been done to reduce the labor requirements in growing and harvesting sugar beets. While much of this work was experimental, resulting in devices of limited application or of no value at all, some efforts have born fruit and resulted in devices of genuine value.

It is the purpose of this review to present pictures and descriptions of devices which have real merit, proved in the field over long periods of use.

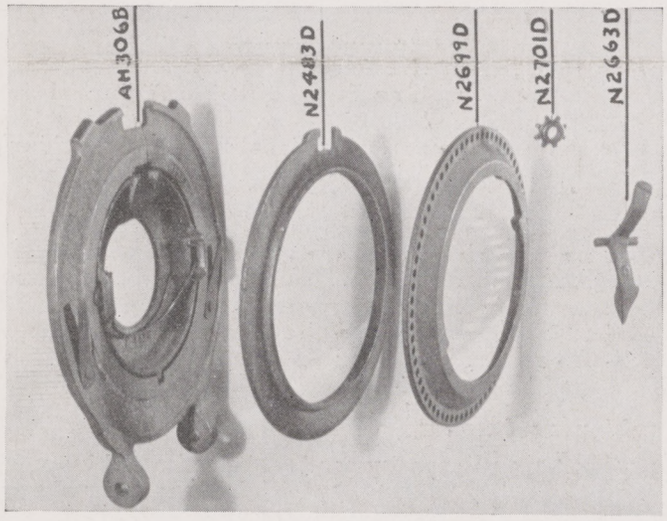
Growers are urged to study each item, and appraise it critically. They should ask themselves these questions: "Does it fit into my beet growing program? Is it something which I can operate efficiently? Will it save labor and money?"

If the answer is "Yes" for any item, follow it up—investigate it from all angles, talk to people who have used it. The Company's agricultural department staffs in either the Sacramento or Salinas district can answer detailed questions, and will be glad to put you in touch with users or manufacturers.



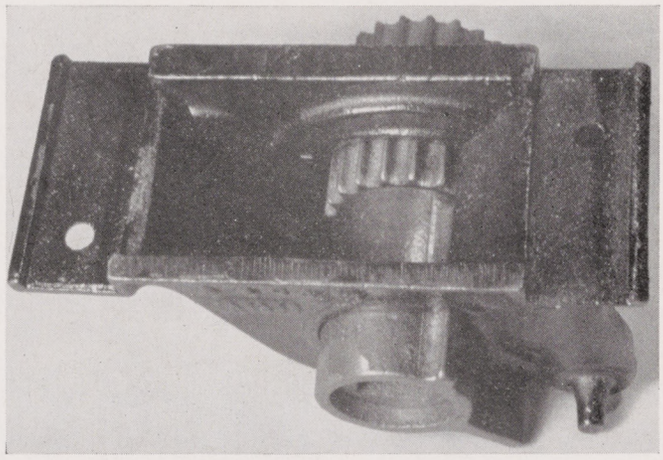
17

Fig. 1.—Sheared seed, improved in germination and uniformity of size, is a "must" for the grower contemplating mechanical thinning or reduction in hand thinning costs.



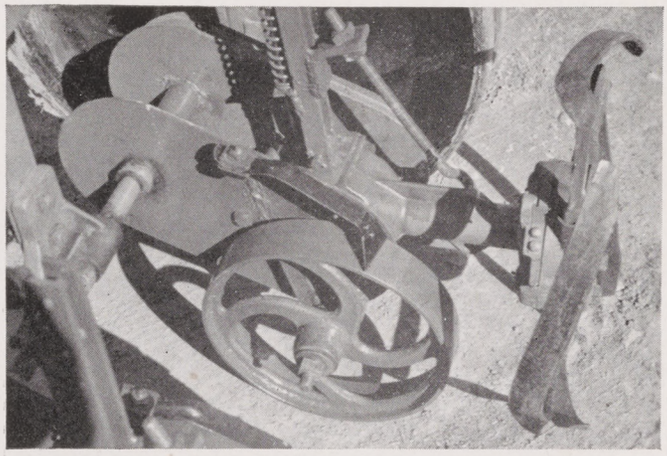
18

Fig. 2.—For accurate planting of sheared seed, this conversion bundle (No. 4060D) for the John Deere plate planter is required. Planting rates as low as 2.6 pounds per acre can be achieved.



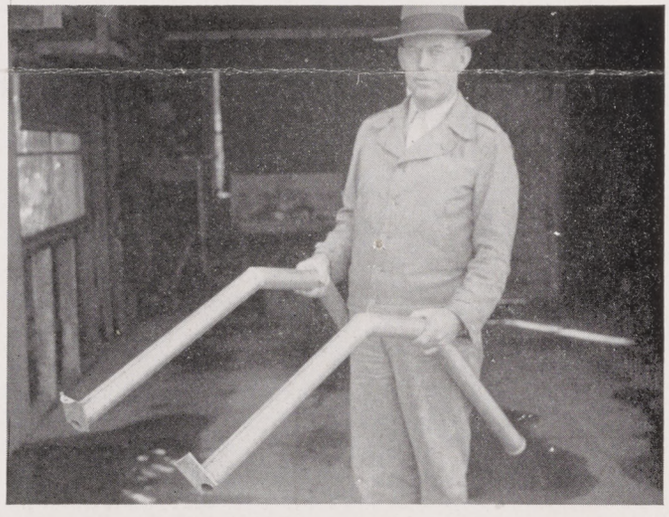
19

Fig. 3.—The Moline Monitor drill can be used successfully at planting rates as low as four pounds of sheared seed per acre when provided with this new small-pitch flute wheel and the additional drive for reversing its direction of rotation (Conversion bundle No. AF 1534).



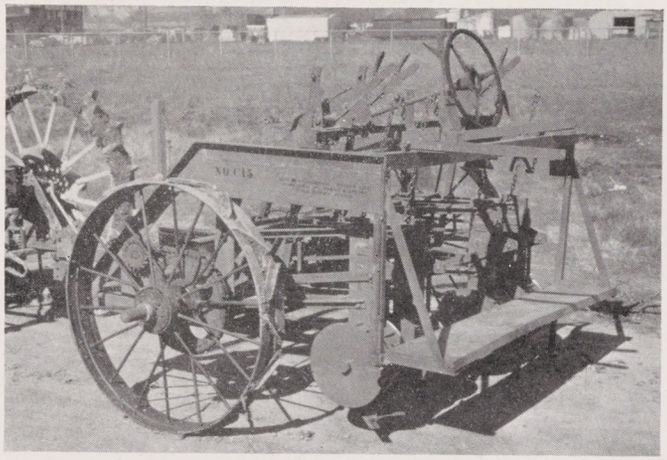
20

Fig. 4.—The Dixie Beet Thinner is greatly improved by adding this gage wheel to insure accurate depth of cut.



21

Fig. 5.—H. V. Morris of Dixon developed these irrigation syphons with adjustable gates to control the flow of water. This prevents flooding and makes possible a thorough job of irrigation. The use of these syphons can effect irrigation labor savings of 50%.



22

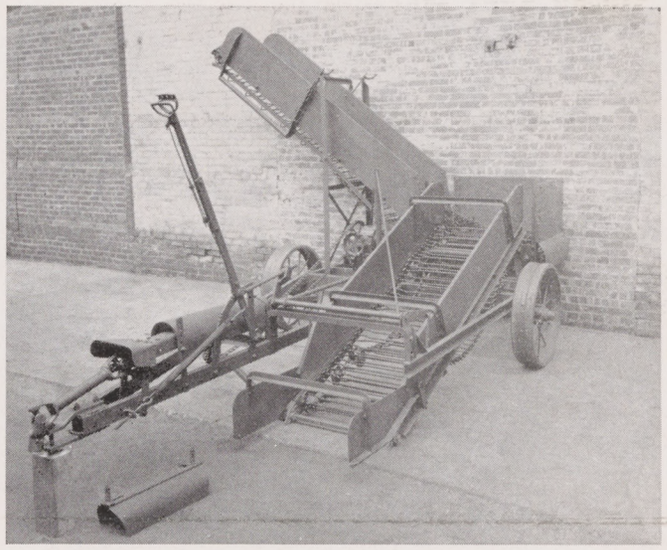
Fig. 6.—The Zuckerman four-row beet topper performs a clean topping job at a rapid rate. One acre or more per hour can be covered, leaving the beets well topped and the tops ready for raking into windrows.

23

Fig. 7.—A side delivery rake, preferably with power take-off drive, effectively windrows severed tops. Sufficient time should elapse after topping to reduce the weight of tops. to be raked.

24

Fig. 8.—This Killefer No. 410BA four-row plow has Colorado-type lifters and special twisted rods which leave the beets on the ground surface and in full view of the loading crew.

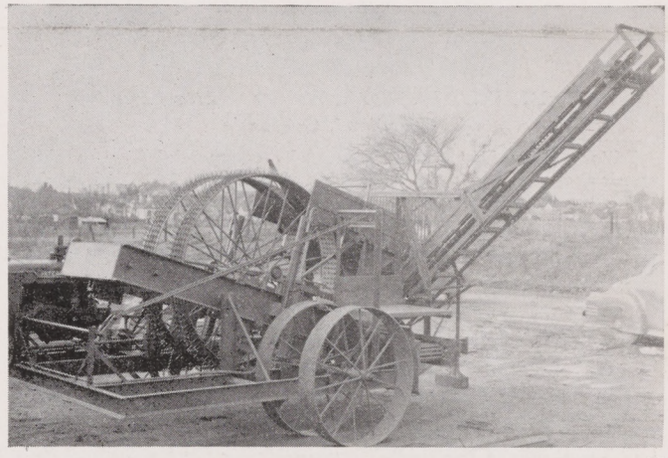


25

Fig. 9.—The windrow loader is a favorite in Colorado, where many hundreds are in use. California growers should investigate its possibilities. Such loaders are made by John Deere Plow Co., Lindeman Power Equipment Co. of Yakima, Wash., and Julius Sishc & Co., Torrington, Wyo.

26

Fig. 10.—The Gaudin Loader is self-propelled both in the field and on the highway. Ten inexperienced men can load from seventy to ninety tons of topped beets in a nine hour day.



27

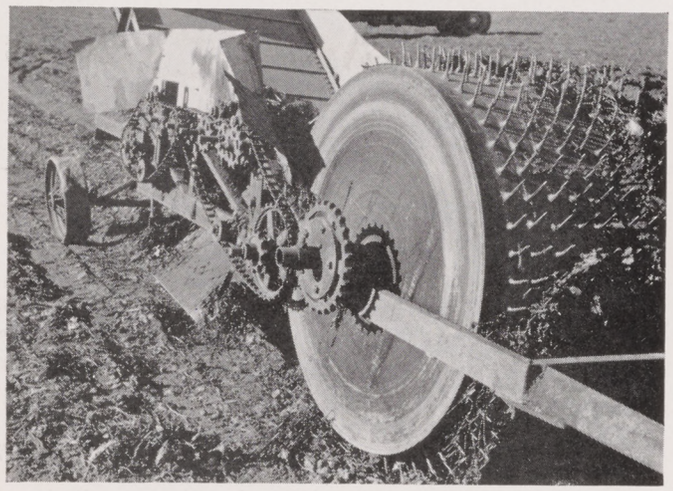
Fig. 11.—For large acreages, where plenty of tractor power is available, the Two-Row Marion Harvester does a complete harvesting job. One operator and a tractor driver can cover over 500 acres in a season. So great has been the acceptance of this machine that the 1944 production has been sold out in advance.

(Continued on next page)

PICTORIAL REVIEW *(Continued from preceding page)*

29

Fig. 12.—For recovering tops after harvesting with the Marion Harvester, this pickup loader was developed by Lloyd and Lewis Schmidt, Route No. 1, Box 94, Walnut Grove, California. Thirty tons of cured tops can be loaded in a day.



30

Fig. 13.—The spike wheel principle is used in combination with a cleaning screen in the Schmidt top loader.

BEET DRILLS CALIBRATED

By ERNEST W. HULL, *Weaver Tractor Company*
Woodland, California

Editor's Note: Assistance rendered by commercial farm machinery repair shops in repair and calibration of beet drills is of real service in better use of sheared seed.

Because of a decided shortage of labor during the present emergency, producers of crops which require a considerable amount of hand labor have been compelled to search for some method of mechanization or discontinue such crops. This situation has especially affected the sugar beet producers of California.

One of the operations in beet production requiring a great amount of hand labor is thinning. In order to reduce the expense of thinning it is necessary to develop some system of planting greatly reducing the number of seeds per acre. This has brought about considerable experimentation on the part of the Spreckels Sugar Co. and the Agricultural Department of the University of California at Davis.

The final answer, we hope, has been found in what is called single seed or segmented seed planting. In order to accomplish the desired results, beet planters must be in good repair and adjusted properly.

At the request of the Spreckels Sugar Co. the Weaver Tractor Co. at Woodland has installed a department for this purpose, with men in charge who have received advice and instruction from Austin Armer, Agricultural Engineer of the Spreckels Sugar Co., and Roy Bainer of the University Department of Agriculture at Davis.

The beet growers deliver their beet planters to the service department of Weaver Tractor Co., where they are checked and repaired so they will do a fairly accurate job of planting. The single seed plates are installed and then the planters are tested, using the "greased board" method developed by Mr. Bainer. The distance of planter travel is calculated, and the beet seed weighed; and thus it is determined just what setting should be made to give the desired number of pounds per acre.

In this system of calibration, as it is referred to, the planter should distribute the seeds in the row with such accuracy that a minimum amount of thinning should be required. This makes it possible to use mechanical devices for the thinning operation, rather than hand labor, which should result in a sizeable reduction in cost to the beet producer.

While this system is yet in its infancy, it is hoped that it will be so successful that the beet industry will be able to survive the present shortage of hand labor and become a more profitable crop to the grower.

FIELD NOTES . . .

Close cultivation is important in reducing hoeing costs. Discs are usually the best suited for the first cultivation.

* * *

Cut worm control: One quart of sodium arsenite to 25 pounds of bran with enough moisture added so that the resultant mash when squeezed will release a few drops of water.

Wireworm damage can be reduced by heavy seeding rates, early and deep cultivation, and delayed thinning.

* * *

A clean labor camp well operated is essential for good labor relations.

* * *

The best results from commercial fertilizer have been obtained when applied shortly after thinning.

Fertilizer supplies are limited and should be ordered early.

BEET DRILL CALIBRATION SIMPLIFIED

By AUSTIN ARMER, *Agricultural Engineer*
Spreckels Sugar Company

The customary method of calibrating drills is to jack up the driving ground wheel, turn it through several revolutions corresponding to a known distance of travel, and weigh the seed discharged during this distance. From the measured weight and distance, the seeding rate in pounds per acre can be calculated.

To simplify this calculation, a method is herewith outlined.

With an average row spacing of 20 inches, there are 26,136 feet of row in an acre. Therefore, if a drill travels 261 feet, it will cover 1/100 acre, and drop 1/100 as much seed as it would in covering one acre. The driving wheel, in covering 261 feet, will turn through a number of revolutions given by the formula:

$$\text{Number of Revolutions} = \frac{261 \times 12}{\text{Diameter (inches)} \times 3.1416} = \frac{995}{\text{Diameter (inches)}}$$

Thus, in covering 1/100 acre, a planter wheel turns 995 revolutions divided by its diameter in inches. Even this simple calculation can be avoided if the following table of wheel diameters is consulted:

TABLE I

Wheel Diameter	*Revolutions in 1/100 Acre*
24″	41½
28″	35½
32″	31
40″	25
48″	21

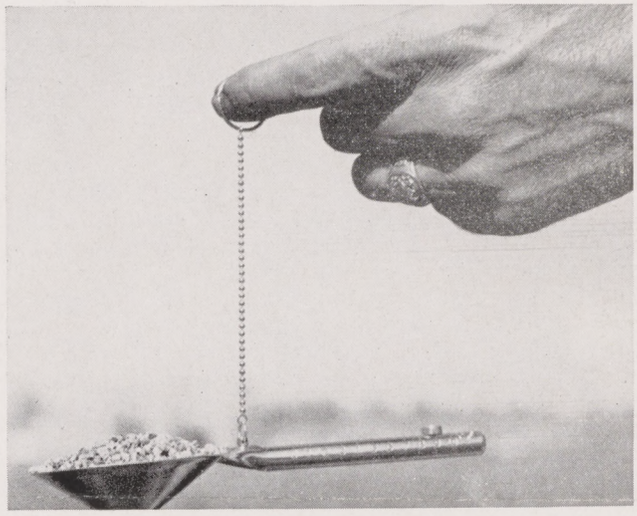
Suppose now that the drill has been jacked up, the seed hopper partly filled, and the wheel turned according to Table 1. The discharged seed, caught in a pie plate or other convenient container can be weighed, and 100 times this weight is the number of pounds per acre which the drill will plant. To simplify this calculation, the following table may be consulted.

TABLE II

Pounds Per Acre	*Pounds per 1/100 Acre*	*Grams per 1/100 Acre*	*Ounces per 1/100 Acre*
2	.02	9.1	⅓
3	.03	14	½
4	.04	18	⅝
5	.05	23	¾
6	.06	27	1
7	.07	32	1⅛
8	.08	36	1¼
10	.10	45	1⅝
12	.12	54	2
14	.14	63	2¼
16	.16	73	2⅝
18	.18	82	2⅞
20	.20	91	3¼

CONDENSED INSTRUCTIONS

1. Jack up the drill frame next to the drive wheel.
2. Mark the drive wheel (with chalk or tie a rag on the rim).
3. Partly fill the seed hopper *with the seed to be planted.*
4. Engage the driving clutch.
5. Place a pie plate under each opener.
6. Turn the drive wheel steadily through as many revolutions as Table I indicates.
7. Weigh the discharged seed on a postal scale, or any available sensitive scale.
8. Find the seeding rate from Table II.



28

Accurately weighing the seed sample for drill calibration is essential. If a postal scale or laboratory balance is not available, this inexpensive "Weigh Spoon," sold by photographic suppliers is quite satisfactory.

MISCELLANY . . .

This issue of the *Spreckels Sugar Beet Bulletin,* devoted almost exclusively to agricultural machinery, was planned and developed by Austin Armer, our agricultural engineer. We believe most growers will enjoy this issue because so many have expressed their desire for more information on this subject.

Weather Forecasts—We had no idea such a large number of our growers would miss so acutely the receipt of the Krick Weather Forecasts, which we discontinued in January of this year after providing the service for three years. Because of the numerous expressions of disappointment at not receiving the forecasts, the matter was reconsidered and, therefore last month the Service was reinstated.

Sheared Seed—Over one-half the 1943 U. S. sugar beet acreage was planted with sheared seed. It is estimated sheared seed will be used on 75% of the acreage in 1944. In 1943, sheared seed was used on 67% of the acreage planted for the Spreckels Sugar Company in the Salinas area and 61% in the Sacramento area. For 1944, we estimate that sheared seed will be used to plant 95% of the company's acreage in the Salinas district, while in the Sacramento district the acreage will probably not exceed 50%. This year's reduced planting of sheared seed in the Sacramento area, we feel, is the result of last year's difficulty in securing satisfactory stands because of adverse weather and the accidental planting of this seed at too great a depth.

Mechanical Thinning and Harvesting of beets can save from $15 to $30 per acre. The Marion beet harvester offers great promise for mechanization of harvest. We believe fields planted with sheared seed properly distributed can be mechanically thinned. The acceptance of mechanical thinning requires a revision of thinning standards. Instead of attempting to secure one beet for 10-12 inches of row, a standard of two, perhaps three, beets each 20-24 inches gives more latitude for mechanical operations. Much available evidence indicates yields will not be sacrificed if stands are considerably less regular

(Continued on next page)

MISCELLANY *(Continued from preceding page)*

than those we have been trying to secure. Additional data on yields of fields thinned mechanically compared with hand thinning is necessary. We shall attempt to secure data and experience of this kind and hope many growers will run tests of their own this year. Dixie Beet Thinners will be available for tests of this kind.

Government Program. I hesitate to write about the Government's support program, as matters which are tentative now will probably be final before this Bulletin is published. It is almost a certainty that the Government will support the price of sugar beets by $3.00 per ton for beets testing 16.5%, and also that this support payment will be made through the processor to the grower. It is fully expected, therefore, that growers will receive the support payment and our company payment at the same time each month during harvest.

March 3, 1944. *J. E. Coke*

FARM LABOR ACCIDENTS COSTLY

By J. E. COKE, *General Agriculturist*
Spreckels Sugar Company

For distribution to its growers, Spreckels Sugar Company has ordered 1,002 Mexican Nationals and as of March 6th 127 men have already arrived to thin the early planted beets in the Salinas District. An additional 425 men have been scheduled to arrive in the Salinas District —March 15, 125; April 1, 150; April 10, 150.

In the Sacramento-San Joaquin area 450 men are to be received for spring work—April 1, 50; May 1, 200; May 10, 200.

Additional men will replace and supplement the 1,002 men now being received. These additional men are to reach California at the start of the beet harvest season. The number so ordered is 500 men in the Salinas area and 750 men in the Sacramento-San Joaquin area.

INSURANCE FOR MEXICAN BEET WORKERS

Last year the blanket compensation insurance policy of California Field Crops, Inc. for Mexican Nationals was secured at the rate of $1.92 per $100 of payroll. Because of the satisfactory accident experience in 1943, the insurance company reduced the rate to $1.75 for California Field Crops in 1944. The policy for both years covers the men engaged in any agricultural occupation, whether they are working in beets or in occupations taking higher rates, such as packing fruit, hauling hay, etc.

ACCIDENTS CAN BE PREVENTED

Many of last year's accidents could have been prevented with some care. In the group caused by carelessness, accidents resulting from transportation of workers were most numerous and serious. With minimum care, practically all these transportation accidents might have been prevented. Carelessness of truck drivers in travelling too fast over rough field roads resulted in many injuries. Some injuries occurred because men were permitted to stand on trucks without sideboards and end gates or allowed to sit with legs or arms protruding from the side or end of the trucks. Accidents result in loss of income to the worker, sometimes loss of life or permanent injury to the worker, loss of man power for the employer, as well as costing him money since the cost of accidents is reflected in the insurance rates.

TRAINING REDUCES ACCIDENTS IN FIELD WORK

The training of workers to avoid accidents, including those due to transportation, should also be carried on by the employers. This includes the proper handling and protection of hoes, knives and other implements used in the field work performed by Mexicans and precautionary measures when these men are working around agricultural machinery.

Although the blanket insurance rate for 1944 is 22 cents under last year's rate, and only 3 cents higher than the rate for sugar beet work alone, a substantial rate reduction can be expected next year, if the 1944 accident experience for California Field Crops is favorable, because of a general revision which is expected in the basic rates for various agricultural crops.

POSTERS OUTLINE MEANS OF AVOIDING ACCIDENTS

To bring to the attention of persons driving trucks transporting Mexican field workers and to the attention of the field workers themselves the necessity of exercising care in preventing transportation accidents, California Field Crops is distributing posters suggesting means of avoiding accidents. Employers should post these in conspicuous places and impress upon employees the importance of following the directions given.

NOTICE TO TRUCK OPERATORS AND WORKERS

During the past year many of our workers were injured in transportation accidents. Such accidents are costly to all concerned in time and money and cause much suffering to the injured.

Please observe the following rules at all times, together with the rules of common sense, in an effort to avoid such accidents during the present season.

TO THE DRIVER

1. Do not start truck, or bus, until certain that all men are properly seated.
2. Drive carefully at all times, especially over rough fields and roads.
3. Do not allow men to ride on fenders or running boards.

TO THE WORKERS

1. Do not get on or off truck when it is in motion.
2. Do not stand on truck.
3. Do not ride on fenders or running boards.
4. Do not ride with arms, legs or other parts of body projecting beyond the sides of the truck.
5. Put tools under seats or carry them in such a way that they are not a menace to yourself or others in case of sudden stops or bumps.

AVISO A LOS QUE CONDUCEN LOS CAMIONES Y A LOS QUE SUBEN EN ELLOS

Durante el año pasado había muchos acidentes de transporte los cuales a los braceros se les hicieron, en muchos casos, daños graves. Tales acidentes son malgastadores de tiempo y dinero y causen padecer mucho a los víctimas.

Sírvanse Vds. obedecer siempre a las reglas siguientes, y todas las del sentido común, al fin de evitar tales desgracias durante el año corriente.

AL CONDUCTOR

1. No ponga Vd. en movimiento el camión sin asegurarse de que estén sentados los pasajeros.
2. Maneje siempre con cuidado, especialmente en pasar por caminos y campos rudos.
3. No deje a los braceros que se coloque ni en los guardafangos ni los estribos del camión.

AL BRACERO

1. No trate ni de subir ni bajar estando en moción el camión.
2. Nunca quede de pie en el camión.
3. No se coloque Vd. ni en el estribo ni en los guardafangos del camión.
4. No permita Vd. que los brazos, ni las piernas ni otra parte cualquiera del cuerpo se extiendan afuera del lado del camión.
5. Los hierramientos, tales como cuchillos, azadones etc. deben ponerse debajo de los asientos o llevarse de tal manera que no constituyan azares ni a sus companeros ni a si mismo en caso de parada inesperada o choque.

Spreckels Sugar Beet Bulletin

Vol. VIII May-June 1944 No. 3 [pages 15-22]

Not available [missing from collection]

Spreckels SUGAR BEET Bulletin

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

Vol. VIII JULY-AUGUST 1944 No. 4

THE ROOT OF GOOD FARMING

41

The beet root and its myriad of feeder rootlets, in search of moisture and food, penetrate and thoroughly interlace the soil up to a depth of six or seven feet. When the beet is removed at harvest time these innumerable rootlets decay and add spongy, absorbent humus to the lower feeding area. By looking at the accompanying illustration taken from an actual photograph, one can easily visualize the tremendous benefit to agriculture in general and especially to the succeeding crop when sugar beets are included in the rotation plan. It is important that moisture be available to the beet plant in the entire soil column, otherwise maximum yields cannot be obtained. Since the mass of roots cannot penetrate or live in dry soils or in soils filled with free water, careful irrigation is necessary if the full soil column is to be used by the plant.

Photograph Courtesy of the U. S. Beet Sugar Association

BEET GROWTH CONTROLLED BY SOIL TEMPERATURE AND FERTILITY

By A. A. TAVERNETTI, *Farm Advisor, Monterey County*

It would appear from observations of many field results, coupled with the results of countless fertilization experiments, that all facts concerning fertilizing sugar beets should have been known by this time. Unfortunately, there still remain many uncertainties, and, in all probability, there never will be a time when the exact time, method and material to be used can be definitely determined in advance.

The most variable factors in the production of sugar beets, as well as other crops, are brought about by prevailing climatic conditions during the growth period. Unfortunately, these factors vary widely from year to year so that it is seldom that conditions of any two years are reasonably the same.

Of the many climatic factors, soil temperature is probably the most important. During the winter months, the soil temperatures are low and progressively increase until mid-summer. On the average, the difference in minimum soil temperature will be from 20 to 25 degrees from planting time to mid-summer. This is graphically illustrated by the curve (A) on the chart showing the average minimum soil temperatures for the years 1941, 1942 and 1943. During December and January, these averages are about 46 degrees, reaching a high of about 68 degrees in July. The same temperatures for the spring months of 1944 to date are projected by the curve (C) showing that the minimum soil temperatures during the early spring months of this year were much lower than the average of the other three years.

Curve B shows the average progressive growth of sugar beet root weight in tons per acre during the growing season. It will be noted that regardless of when sugar beets

(Continued on next page)

FERTILIZER PRACTICE IN SALINAS AREA

By R. S. LAMBDIN, *Assistant Agricultural Superintendent Spreckels Sugar Company*

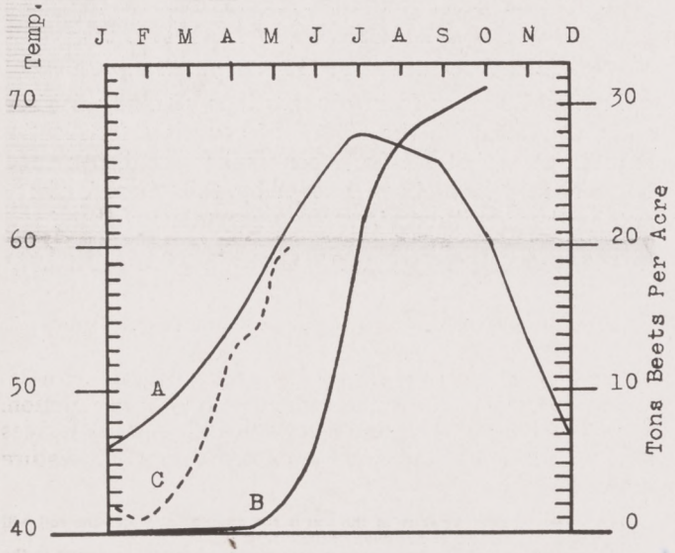
The application of fertilizers has proven of great importance in the growing of sugar beets in the Salinas Valley. Growers have found by years of experience that the introduction of sufficient plant food elements, at the time the plants are establishing themselves and growing, promotes production of maximum tonnage and maximum production can only be obtained if plant growth is in no way retarded by lack of sufficient plant food.

(Continued on page 28)

BEET GROWTH *(Continued from preceding page)*

are planted, there is comparatively little root weight accumulation until the early part of May, or at a time when the minimum soil temperatures range above 55 degrees. Sugar beet root growth takes place most rapidly during June and July. The growth curve closely parallels the soil temperature curves.

The question may be asked, "What has this to do with



A.—Weekly average minimum soil temperatures 1941, 1942, 1943.
B.—Sugar beet growth by months.
C.—Weekly average minimum soil temperature 1944.

fertilizer application?" It is obvious that the most critical time in the growth of sugar beets is during the months of June and July when temperatures are high and absorbing of plant food is possible. It is during this period that the beets will make the greatest drain on soil fertility. Since sugar beet root growth begins in the early part of May, it is necessary that some fertility be available in the soil at that time. The demand on the fertility will progressively increase until about the first of August. If any recommendations can be made as to when to apply a quickly available fertilizer in one application, such as nitrogen, it would be at a time that would make it available early in this period, unless there is already in the soil sufficient fertility to carry the growth for some time.

The question of making one, two, or three applications of fertilizer depends largely on individual field conditions. Unfortunately, nitrates are lost if they are not used by the plant within reasonable time; therefore, heavy applications made too early or at such times when the plants are not in a position to use nitrogen in large amounts will probably result in considerable loss.

Generally speaking, there is little need for fertilizing prior to May 1, except in such sandy and light soils that are likely to be seriously rain leached on the surface, which results in retardation of growth of the sugar beets during the seedling stage or up to thinning time.

Making one heavy application about the first of May has been a general practice and is probably as good a time as any for a single application; however, many times the soil fertility is already such that there is no great need for nitgrogen fertilizers until later in growth. Under such conditions, applications made at that time will probably give better results, since if made earlier there may be considerable loss because of the lack of need of the plant at that time.

Obviously, the difficulty of applying fertilizer when the beets have a large leaf growth eliminates machine application and restricts application to spreading in irrigation waters. Many growers have materially increased their yields by applying a heavy late application of fertilizer following a light early application. Generally speaking, deficiencies in plant food have been greater during the latter growth of sugar beets than at any other time. The time element is important and any application of fertilizer should not be made at a time that will not allow at least six weeks' interval before harvest.

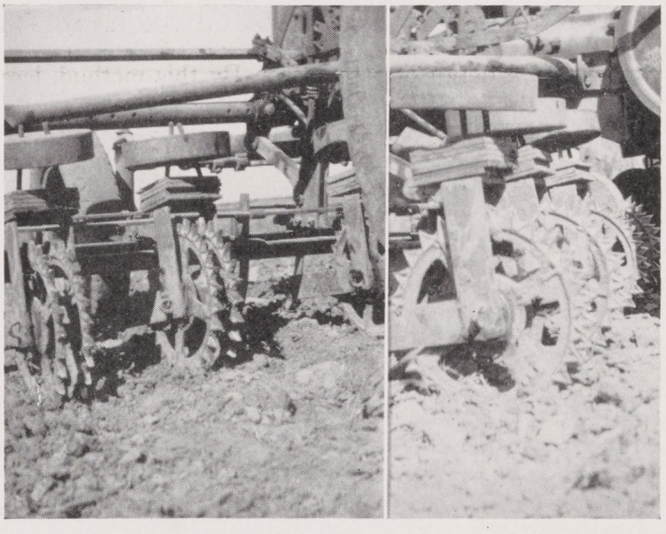
CRUST BREAKER DEVISED BY FUSCHLIN

By J. C. LARSEN, JR., *Agricultural Department*
Spreckels Sugar Department

Mr. A. Fuschlin, who farms in the Sutter Basin District, has developed an easily constructed device that is very effective in breaking crust along the beet row.

Two corrugated rings from a Western Land Roller are mounted on an individual axle. A pull rod from each end of the axle is attached to the cultivator bar on the tractor. Each pair of rings is a separate unit and is placed directly over the beet row. Weights can be added to each unit when conditions warrant.

The hubs on the corrugated rings give adequate spacing to straddle but not run on the row. They are, however, close enough to break the crust.



42

Rear and side view of a crust breaker made with the corrugated rings from the Western Land roller mounted on a cultivator bar.

COST SAVING IN IRRIGATION

By W. B. MARCUM, *Agricultural Department*
Spreckels Sugar Company

A resumé of irrigation practices during the past few years shows that better irrigation management has resulted in a definite cost saving and greater yields for many growers. An increase in knowledge of irrigation problems has enabled growers to maintain better control over the application of irrigation water. Some of the factors influencing proper irrigation are:

1. Land should be properly leveled so that water distribution may be more uniform.

2. Seed bed preparation and cultivation may seriously "injure" the soil if worked while too wet. Such injury frequently is long lasting and may reduce all crop yields for several years.

3. A definite saving in cost can sometimes be made from the use of information that can be made available regarding certain soil moisture factors. With a knowledge of the water holding capacity[1] and the wilting percentage[2] of a soil, it is possible to determine by soil moisture tests, made at periods throughout the growing season, the amount of water that is available in that soil for the plants. Knowing these factors, a determination can be made as to the proper time to irrigate.

If water is applied too early the plant may suffer from excess, or free, water held in the soil above its water holding capacity. Such a condition retards plant growth as roots cannot function in that portion of the soil from which air is excluded because the soil is completely filled with water. Regardless of the effect on the plant, the cost of applying the water in such cases has been wasted because the application was unnecessary.

On the other hand, if irrigation is delayed until all available moisture has been extracted from the soil by the plant, that is, down to the wilting point of the soil, growth will be retarded because of the lack of moisture.

Before applying irrigation water, particularly for the first irrigation after thinning, the soil moisture percentage of the soil should be determined. The agricultural staff of the Spreckels Sugar Company stands ready to assist growers in obtaining this information.

4. When it has been determined that an irrigation is necessary, an attempt should be made to apply sufficient water so that the soil will be wet to its water holding capacity to a depth of 5 to 6 feet. By this method, less frequent irrigations are necessary, thus resulting in savings in irrigation costs. It may be necessary to apply only a small amount of water in the first irrigation as only the first foot or two of the soil may be low in moisture content. During the early season, before roots have penetrated to any considerable depth, surface moisture is consumed at a much more rapid rate than in the lower strata of the soil.

5. Land which is not level necessarily presents many problems in applying irrigation water. Such land should generally be irrigated with small streams of water in order that proper penetration may be obtained without flooding the land. In such cases, many growers use tubes, siphons, old bicycle tires, old fire hose or short lengths of pipe in order to control accurately the distribution of water to the various furrows.

6. Soils which are impervious, or tight, also require irrigating with smaller streams of water in the furrows so that the water can be held on the land until necessary penetration has been secured.

Because it is possible to make larger furrows when the crop is planted with rows spaced 14″-26″ or 16″-24″, rather than regular 20″ plantings, this system is frequently used on land that is not generally level and greatly aids proper irrigation.

43

Bed planting lends itself well to uniform applications of water.

Because of the importance of proper irrigation in securing good crop yields and reducing costs of production, Spreckels Sugar Company's agricultural representatives will be glad to assist growers in determining the moisture content of soils.

1. The *water holding capacity* of the soil is the amount of water the soil will hold after all free water has been drained from it.
2. The *permanent wilting percentage* is the amount of water remaining in the soil after a plant has wilted permanently. Plants cannot remove all the moisture from a soil. The amount they cannot obtain, expressed as a percentage, is known as the permanent wilting percentage.

FIELD NOTES . . .

CHECK WITH THE AGRICULTURAL CONSERVATION ASSOCIATION OFFICE BEFORE HARVEST TO BE SURE FARMING PRACTICES ARE IN COMPLIANCE FOR BENEFIT, DEFICIENCY, OR ABANDONMENT PAYMENTS.

TIMELY IRRIGATION IS IMPORTANT TO MAINTAIN CONTINUAL GROWTH FOR MAXIMUM SUGAR AND TONNAGE.

COVER CROPS PLANTED IN THE FALL ON PRE-IRRIGATED LAND PRODUCE THE BEST STANDS AND HEAVIEST GROWTH.

PLANT—LATE SEPTEMBER, EARLY OCTOBER: VETCHES, MELILOTUS, HORSEBEANS, MUSTARD, PEAS. LATE OCTOBER, NOVEMBER: FENUGREEK.

SCRAPING MANURE INTO PILES NOW WILL AID IN CONSERVING ITS VALUE UNTIL SPREAD ON THE LAND LATE THIS FALL.

PREPARATION FOR HARVEST INCLUDES TRUCKS, BEET BEDS, TRACTOR SHOES, BEET PLOW, AND TOPPING KNIVES.

RESULTS OF UTILIZING SUGAR BEET TOPS FOR LIVESTOCK FEED IN MONTEREY COUNTY

By REUBEN ALBAUGH, *Assistant County Agent*

The digestible nutrients in 100 pounds of sugar beet tops compared on a dry-matter basis with alfalfa hay are as follows, according to H. R. Guilbert, Associate Professor of Animal Husbandry from the University of California at Davis, California:

	Digestible crude proteins in lbs.	Total digestible nutrients in lbs.
Average of 48 American and European beet-top samples	9.7	59.5
Alfalfa hay (dry basis)	11.7	55.6

These data show that beet tops have a high feed value for cattle and sheep. To fully utilize this valuable feed is a problem that must be solved through cooperative action of both the beet grower and the livestock producer. It is estimated that less than 60 per cent of the acreage of beet tops was used for feed in Monterey County during 1943.

The following are results on utilizing sugar-beet tops in Monterey County which may serve as a guide to livestock growers who plan to use this valuable feed:

I. PASTURING

Julius Trescony, San Lucas, ran 127 head of short two-year-old steers and heifers on 135 acres of sugar beet tops for 94 days. This field produced 16 tons of sugar beets per acre. These cattle gained 1.3 pounds per head per day and one acre of beet tops produced 116 pounds of beef per acre. This work was carried on in 1942.

Jim G. Bardin, Salinas, in 1942 pastured 55 head of long two-year-old steers for 60 days on 57 acres of sugar beet tops. This field produced 14 tons of sugar beets per acre. These cattle gained 1.56 pounds per head per day and one acre of beet tops produced 91 pounds of beef. Mr. Bardin states that the tops were not completely utilized on this field and he felt that the cattle were not gaining sufficiently to pay 10 cents per head per day for the feed.

44

Cattle pasturing on beet tops.

In pasturing beet tops some labor is saved. On the other hand, much of the feed is wasted by the tops becoming leached out by rain, fog and other weather elements, and from shattering and trampling of the cattle. Fencing of fields and developing of water, plus the hauling of cattle to and from the fields are costs that cannot be overlooked. This method of feeding beet tops is not as cheap as it would seem at first after all factors are considered.

II. SHOCKING AND HAULING LOOSE FROM THE FIELD

Walter S. Markham, Salinas, hauled 44 tons of cured beet tops from 12.7 acres of land that had produced 13½ tons of sugar beets per acre during 1943. The tops were allowed to dry and cure in the field two weeks before being shocked and hauled. They were hauled 12 miles and each load was weighed on leaving the field. Three men and two trucks were used and it took eight days to haul the 44 tons. The men were paid $5 per day. The total cost of labor and trucks was $380, while the cost of the tops was $6 per acre, or $76.20. The total cost was $456.20 or $10.37 per ton of tops delivered at the ranch.

Tognetti Bros., King City, during the same year hauled 45 tons of cured beet tops from 15 acres of land that produced 18 tons of sugar beets per acre. These tops were hauled two miles and stacked with a Jackson fork and derrick at a cost of $1.86 per ton for labor and truck and 53c per ton for the tractor. The piling cost was $2 per ton, or a total of $4.39.

III. BALING

Roy B. Martella, Salinas, baled beet tops on 35 acres that had produced 28 tons of sugar beets per acre in 1943, at a total cost of $3.78 per ton of tops. The tops were allowed to cure in the field for 10 days and were then piled in small shocks and left for two weeks longer. This operation cost $1.53 per ton. One Filipino piled on the average of one acre per day. The baling cost of $2.25 per ton included labor, material and overhead cost of baler. This field produced 3.8 tons of baled tops per acre with an average moisture content of 27.13 per cent and an average weight per bale of 135 pounds. Four men made up the crew on a John Deere pickup baler which was used.

This practice of conserving and storing beet tops shows a lot of promise. Such a practice not only cuts down the waste of valuable feed where pasturing is used, but at the same time more beef and milk are produced per unit of feed. It is estimated that about twice the amount of production can be secured from cured, stored beet tops as compared to the production received when they are pastured.

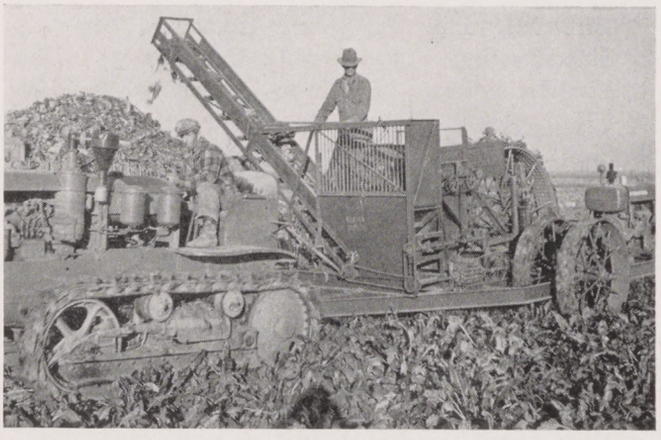
IV. SILAGE

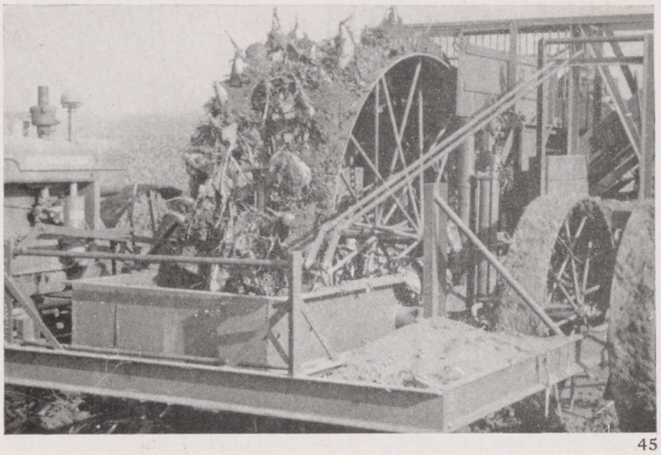
In 1942, H. T. Davis of Salinas and Tom Hambey of Soledad stored considerable tonnage of green beet tops in stacks for silage. This method of conserving this feed is the best to date since less nutrients are lost. Where trench or upright silos are available, tops can be successfully stored in them.

In order to make good silage, the tops should be green and carefully stacked. The stacks should be about ten feet wide, sides brought up straight and successive layers of tops added so that the settled stack is about seven feet high.

Cost data collected on hauling green tops for silage was about $4 per ton of silage where the haul is not over ten miles. One ton of good beet top silage will replace about 700 pounds of alfalfa hay. Beet tops need not be chopped for silage.

TWO-ROW MARION HARVESTERS AVAILABLE FOR 1944





45

Marion Beet Harvesters, manufactured by the Blackwelder Iron Works of Rio Vista, offer great promise for the complete mechanization of sugar beet harvest. It should be possible by the use of machines owned by growers and those owned by the Spreckels Sugar Company for rental to growers to harvest mechanically a substantial percentage of the 1944 crop.

THE SUGAR RESEARCH FOUNDATION

By P. W. ALSTON, *General Chemist*
Spreckels Sugar Company

When you open your daily newspaper or your favorite weekly you are frequently impressed by the advertisement of some major industry—automotive, petroleum, steel, or perhaps the railroads are asking you not to try the trains at this time. These ads usually do not attempt to create a sales appeal for any particular product or service. What, then, is the object of such an appeal? The answer is, for the creation of a favorable public opinion. Public opinion has become a powerful influence in our national life and in international relations. Why should it be necessary to create a favorable public opinion for any particular industry? It is because there are persons, factions, or groups who, for reasons frequently obscure, attempt to mold public opinion to their own way of thinking and for their own motive. In the case of our own industry, sugar, we have been subjected for several years to a maze of adverse propaganda against the domestic industry in particular and the use of sugar in general.

Individual sugar producers for years have attempted to combat and offset these adverse depreciations of an industry that has succeeded in supplying man with the cheapest form of wholesome energy food, but individuals working alone never could cope with the volume of detraction thrown at the public today. Responsible leaders in the industry realized this situation and in June, 1943, organized the Sugar Research Foundation. Growers, processors, and refiners have all joined into this cooperative effort. The membership of the Foundation consists of practically all cane refiners in this country, the beet producers and processors and the raw sugar producers in continental United States, Hawaii, Puerto Rico, and Cuba.

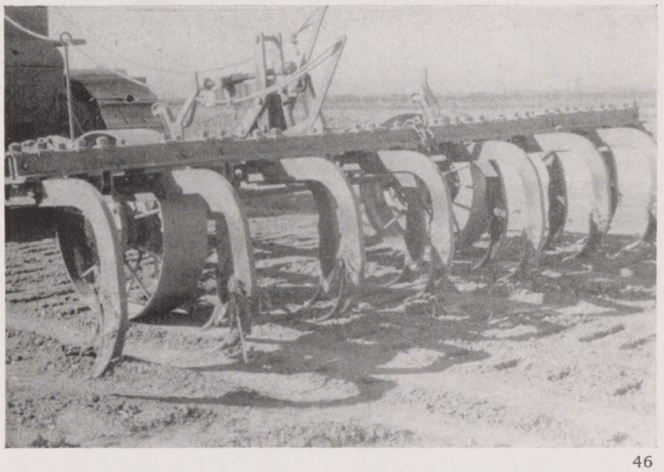
The purpose of the Sugar Research Foundation is to find out all the truth about sugar and its various uses. Therefore, the Foundation will engage in scientific research work in the several fields of sugar. Particular attention is being given to a complete study of the role of sugar in human nutrition. In non-food uses there are now over 70 industrial uses for sugar. New and extended uses will be sought. Many chemical compounds are made from sugar as a basic material. Projects are now under way to expound this field and research for new products is being planned.

A new Sugar Research Foundation Laboratory has been established in connection with the Massachusetts Institute of Technology in Boston. Individual studies have been arranged with several other universities and medical schools.

In addition to these scientific activities, the Sugar Research Foundation will conduct public relations work to offset and answer the present adverse propaganda on sugar.

That such a program should be undertaken at this time indicates that the leaders in the sugar industry are not neglecting their own postwar planning but are looking forward to the expansion of the uses of sugar and at the same time endeavoring to build up in the public mind the important role of sugar.

AN ASSET TO GOOD FARMING PRACTICES



46

In common use in the Salinas area are heavy land chisels for the preparation of beet seed beds. The land is not usually plowed to excessive depths, but the subsoil and plow soles are broken up by the use of these land chisels, which penetrate to a depth of 18 to 24 inches.

FERTILIZER PRACTICE (Continued from page 23)

47

A A

Field of beets fertilized with 400 pounds of Sulphate of Ammonia per acre with two ridges not fertilized. See "A."

The beet field in the above photograph received five tons per acre of steer manure prior to planting. Beets were planted on February 19 and thinned April 8. Soon after thinning a side-dressing of Sulphate of Ammonia was applied at the rate of 400 pounds per acre. Four rows were missed by the fertilizer drill and the outstanding difference in growth and color is definite evidence of the need of this extra nitrogen to secure maximum yield.

The grower is now irrigating this field and applying anhydrous ammonia at the rate of 50 pounds per acre in the irrigation water. This practice has proven of considerable value and has become a common practice with some growers the past few seasons.

48

Manure piled at the field for distribution on the field.

Beet growers in the Salinas Valley are generally using good crop rotation programs, but find it necessary to make rather heavy applications of commercial fertilizers in order to secure maximum yields. The following are some of the common practices of commercial fertilization being carried on in the valley during 1944:

Field No.	Method of Applying Fertilizers	Kind of Fertilizer	Lbs. Fertilizer per Acre
1.	Side Dressing	10-10-5	400
	First Irrigation	Anhydrous Ammonia (NH_3)	100
2.	Side Dressing	Sulphate of Ammonia	600
3.	First Irrigation	Anhydrous Ammonia (NH_3)	100
4.	Side Dressing	Sulphate of Ammonia	450
5.	Side Dressing	17-7-0	500
6.	Side Dressing	17-7-0	500
	Second Irrigation	Anhydrous Ammonia (NH_3)	75
7.	Side Dressing	Sulphate of Ammonia	400
	Second Irrigation	Anhydrous Ammonia (NH_3)	75
8.	Side Dressing	Sulphate of Ammonia	480
	Second Irrigation	Anhydrous Ammonia (NH_3)	75

SPECIAL SUGAR ALLOTMENT FOR GROWERS

The Office of Price Administration on April 1, 1944, issued Amendment No. 7 to Rationing Order No. 3 which provides that growers of sugar beets for the 1944 crop may obtain, subject to certain qualifications, sugar direct from the Processor free of excise tax and without surrender of ration stamps. This special sugar allotment for growers is in addition to regular civilian sugar ration allowances.

The essential highlights of the amendment briefly summarized are:

HOW MUCH SUGAR CAN BE OBTAINED

1. 25 pounds per member of grower's family unit or 25 pounds per acre of beets grown and delivered to Processor, whichever is smaller. (Where more than one grower participates in a crop, each grower's share of the 25 pounds per acre is in direct proportion to his crop participation.)

WHERE AND WHEN CAN SUGAR BE OBTAINED?

1. At Woodland or Spreckels, California, plants of Spreckels Sugar Company.

2. After grower's 1944 sugar beet crop has been harvested.

HOW GROWERS BECOME ELIGIBLE FOR SUGAR

1. Six months residence on farm.

2. Delivery of 1944 crop of sugar beets to Processors.

3. Make statement at Processor's factory addressed to Office of Price Administration, showing:

(a) Name, address, date.

(b) Statement of eligibility including data regarding 1944 harvested sugar beet acreage and number of members in family unit.

(c) Sugars, if any, previously obtained under this amendment.

(d) Total amount of sugar applied for.

4. Sugars obtained under amendment must be for personal use only.

Growers applying at factories for sugars allowed by this Amendment are requested to bring with them all pertinent data. The Spreckels Sugar Company will be glad to assist growers in the preparation of statements.

YOUR SUGAR BOWL'S A BOMB!

THIS YEAR, MORE SUGAR THAN EVER BEFORE IS FLOWING INTO FACTORIES, TO BE USED IN MANUFACTURING EXPLOSIVES, SYNTHETIC RUBBER, AND A VARIETY OF OTHER VITAL WAR MATERIALS. ALTHOUGH CIVILIAN SUPPLIES WILL PROBABLY BE TIGHT, EVERYTHING IS BEING DONE TO SEE THAT YOUR RATIONS WILL NOT BE SERIOUSLY AFFECTED. HERE IS THE STORY OF SUGAR'S FIGHTING ROLE IN THIS WAR.

The first time war struck on the consumer food front was in those February days of 1942 when we lined up for our first ration books. The first food to be rationed was sugar. It led the list for good reasons. Stocks of sugar were greatly reduced by the record takings of consumers in 1941. Submarines were rampant along our Atlantic Coast and ship after ship was going to the bottom. Our shipyards were not geared for replacements. The Philippines, which normally furnished about 15 per cent of our sugar, were in Jap hands. Naturally sugar was scarce. So sugar was the first food to make its departure for war felt on our tables.

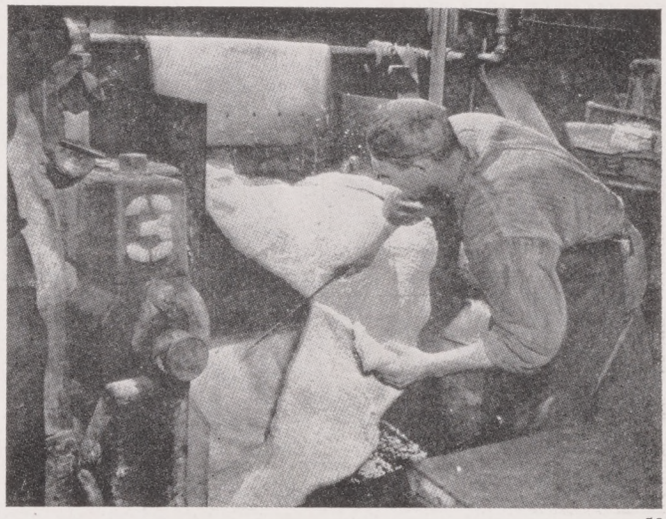
Then 10 months later when the undersea wolf packs were tamed by our Navy and ships were launched faster than they were destroyed, the transportation problem eased and larger quantities of sugar became available. Nevertheless, the increased demands of war for sugar still make great inroads on our supplies. For sugar goes to war in different forms than as candy bars for our far-flung

49

These shells made partly from blackstrap molasses, will probably be blasting our enemies before long.

canteens, in K-rations, and for our armed forces' coffee-cups. In fact, that demand is roughly only about 10 per cent of the service which sugar gives toward victory.

We, on the home front, have our own tremendous demands for sugar. Home canners don't need to be told what a vital part sugar is playing in the preservation of food. This year, as in previous war years, a large quantity of sugar will be set aside to meet civilian demands for canning purposes. We expect to receive the same amount of sugar for canning that we did last year—25 pounds per person. Stamp No. 40 will enable you to buy 5 pounds of canning sugar at your local store any time during this year. If you need more, you can apply to your local Price and Rationing Board. Your applications should be in writing, and should be accompanied by Ration Book No. 1 for each person for whom application is made. You should also mention the total number of quarts or pounds of finished fruit to be put up, and the quantity of sugar to be used for making jams and jellies.



50

One important product derived from sugar is synthetic rubber. This sheet of crude rubber will later be manufactured into tires.

But the combined military and direct civilian needs for sugar, as a food, still represent only a part of its total war uses. Sugar flows into the roaring plants of industry, There's hardly a war commodity of which sugar is not a necessary part. Normally, blackstrap molasses, a byproduct of sugar, is the chief source of industrial alcohol, and alcohol goes into the making of an endless variety of products. The alcohol made from blackstrap molasses, by the way, is strictly for industrial uses, and not for beverage purposes. This year, however, as in 1941 and 1942, vast quantities of invert molasses, from which no sugar is extracted, are needed in the manufacture of industrial alcohol. This invert molasses will mean the loss of 800,000 tons of sugar for food purposes.

One of the most important products derived from industrial alcohol is synthetic rubber. During the coming year, industrial alcohol is expected to supply about 53 per cent of all the butadiene employed by our synthetic rubber industry. Butadiene is the chemical element out of which all synthetic rubber is formed.

You have often heard the phrase "food is a weapon." In the case of sugar this phrase is literally true, as sugar, via industrial alcohol, is used to manufacture explosives. Some sugar was used to make almost every bomb that is being dropped on Germany. Most of the shells that are battering the Axis into defeat are made from sugar derivatives. And sugar is making hand grenades for our Marines to blast the Japs out of their island fox holes. Sugar looks innocent enough in the bowl on your table, but it can be turned by various stages of manufacturing into a potent agent of destruction.

Another important industrial use of sugar is in the manufacture of plastics. This versatile branch of the chemical industry is supplying an ever-increasing variety of commodities from soup pans to airplanes. Most important plastics derived from sugar are celluloid and celloglass. Right now, plastics are playing a vital war role by substituting for metal in many different ways. The chemical

YOUR SUGAR BOWL'S A BOMB!

industry is also opening up new uses for sugar, in the manufacture of dyes, varnishes, and medicines.

Taken all in all, sugar is doing a man-sized job in this war. Other uses not so spectacular as those already mentioned, are no less important. Almost every convoy that crosses the ocean, carries sugar for our allies, and for the people in liberated areas. Relief needs for sugar are expected to be fairly large, and it will probably be used in relief rations, to strengthen the resistance of starving people in war-wrecked territories all over Europe. The Red Cross is distributing sugar to aid prisoners of war, and war refugees. Some Red Cross sugar has been sent to India, to help check the present famine. Recently, the Red Cross requested sugar allotments from the War Food Administration, to relieve the hunger of hundreds of penniless Polish refugees, driven out of their home country by the Germans and now settled in Africa. Sugar is placed in each Red Cross parcel that is sent to Switzerland for later distribution to prison camps in Germany and Italy.

All these demands together are making a large dent in our sugar stock. But in spite of the fact that the total demand for sugar this year has greatly increased over last, the OPA doesn't expect that consumer rations will be drastically affected.

Our present sugar stocks are being built up from several different sources. We usually grow about 30 per cent of our sugar here in the continental United States. Most of this 30 per cent comes from the various sugar beet growing States in the Middle West and Far West, and the rest from sugar cane grown in Florida and Louisiana. Last year, our beet sugar supplies were about 40 per cent less than the supply in 1942.

Before the war broke out, we got large quantities of sugar from the Philippines, Hawaii, Cuba, and Puerto Rico. Now that the Philippines are temporarily in enemy hands, we have been depending more and more on the supplies of the other three areas; particularly those from Cuba. Almost the entire Cuban crop has been bought by this country, during the last 3 years, and Cuba has increased her sugar output this year, to help fill the growing sugar requirements of the United States and our allies.

Puerto Rico and Hawaii have been producing about the same quantity of sugar as they did before the war. However, because of shortages of fertilizer and machinery, the sugar output of these domestic insular areas may decline this year.

Despite the difficulties of importing sugar supplies from abroad, of maintaining production here at home, and of assuring an adequate distribution of sugar to our wartime industrial program, everything is being done to see that civilians have adequate supplies this year. Sugar is going to keep on fighting on both fronts this year, and it will continue to play a major part in winning this war.

—From Consumers' Guide, W. F. A.

MISCELLANY . . .

Sugar Legislation: The Sugar Act of 1937 has now been extended by Congressional Action and by signature of the President to cover the crop years 1945 and 1946. In extending the Act, no change was made in its provisions. Therefore, there will be no change in the amount of the payments under the Act or conditions for receipt of benefit payments.

WAR PRISONERS: POSSIBILITY FOR HARVEST

By C. E. CRANE, *Agricultural Superintendent*
Spreckels Sugar Company

German war prisoners offer a possibility in relieving labor shortages for the 1944 harvest of crops in many areas of California if the supply of domestic labor and Mexican Nationals is not adequate.

To obtain experience with the handling and use of war prisoners, the Spreckels Sugar Company, in cooperation with the Monterey County Farm Labor Office of the Agricultural Extension Service, arranged to secure 50 men from the prisoner of war section at Fort Ord. These men were used in beet fields for hoeing, and for the thinning of lettuce.

The majority of the men were quite keen and asked many questions as to why so much lettuce seed was planted if a large number of the plants were to be destroyed and, why, instead of destroying the plants, they were not transplanted to other fields. In fact, at various times during the first few days of work the men actually filled in blank spaces in the lettuce row in the thinning operation.

The quality of the men's work was excellent after they became acquainted with what was desired of them. The output of work, however, was very small as it required about four prisoners to do the work of an average field laborer. This small output of work is, however, not too serious as the grower pays for the work on a piece work basis. Under the arrangements with the Army, the growers pay to the Army the agreed piece work rate for work accomplished and the Army, in turn, pays the prisoners a minimum of 80 cents per day with an incentive of an additional 40 cents for output of sufficient work of good quality. The pay to the prisoners is not in the form of cash, but in the form of canteen checks. Transportation of the prisoners must be furnished by the grower, for which he receives reimbursement from the Army of 1 cent per mile per man. The Army provides all food for the men and the necessary guards.

The men may be away from their camps not more than 10 hours, so in order that they may work at least 8 hours per day it is generally considered that a distance of 25 miles from the camp is the maximum these men should be transported. This limits somewhat the area that can make use of prisoner labor. There is a possibility of establishing additional camps if labor conditions become acute during the fall harvest.

Of the 50 prisoners used in this experiment, three were German sergeants and one, a medical man.

No civilians are permitted to converse with the prisoners except to communicate all instructions to the German sergeants through an interpreter, who is furnished by the army and is on the job all the time during the work period. The sergeants, in turn, supervise the prisoners in their field activities.

It is interesting to note that this entire group was formerly with Rommel's Africa Corps and was captured during the North African campaign. They were a husky, well built group of men, ranging in ages from 20 to 25 years.

Spreckels SUGAR BEET Bulletin

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

Vol. VIII SEPTEMBER-OCTOBER 1944 No. 5

SOME POINTERS ON IRRIGATION EQUIPMENT

By LEWIS REESE, *Pump Test Engineer, Pacific Gas & Electric Co.*
J. P. MCELROY, *Sales Department, San Joaquin Power Division, Pacific Gas & Electric Co.*

The most important and expensive piece of equipment on many farms is the irrigation pumping plant, and it goes without saying that important repairs on such a plant should be made by an expert. There are, however, a number of difficulties which can be avoided, and a few which can be repaired by any mechanical-minded layman if he will just keep in mind the following facts:

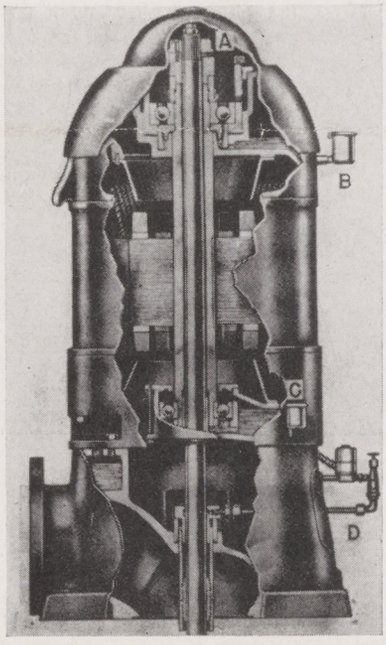
ELECTRIC MOTORS

The electric induction motor properly installed and lubricated will operate for years with little attention. Housing for protection from moisture and dust is important. Some turbine pump motors are built weatherproof and may be left in the open if all bearing housings and air ducts are protected from rain, sun, dust, trash, and mice.

Motors should be kept clean for best operation. If dirt and oils are allowed to accumulate in and on a motor, the air circulation is retarded, which causes undue heating. Motors that are dirty should be steam-cleaned, thoroughly dried, and then varnished. This work should be done by competent motor repair shops.

All motors generate heat and become warmer than the surrounding air when operating. As a general rule, it is not safe to permit the temperature to go above 180

SECTION OF VERTICAL MOTOR FOR TURBINE PUMP



51

A. — Adjusting nut for raising or lowering pump impellers.

B.—Oil gauge for combination motor and thrust bearing.

C.—Oil gauge for bottom bearing of motor.

D.—Solenoid controlled drip oiler for pump shaft.

"Through the Leaves"

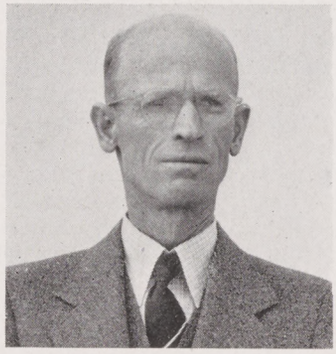
(Continued on page 35)

FARMERS MEET MACHINERY PROBLEM

AGRICULTURAL ENGINEERING SPECIALIST RECOMMENDS PREVENTIVE MAINTENANCE AND ANTICIPATION OF NECESSARY PARTS

By J. P. FAIRBANK, *Extension Specialist in Agricultural Engineering Agricultural Extension Service, University of California*

Farm machinery production, on the whole, is improving, and rationing is being simplified to some extent, but still there are not enough new machines, parts, and repair services to go around. The War Production Board permits the manufacture of farm machinery parts in unlimited proportion of the total amount of materials allocated but the materials and labor put into parts take just that much from the possible production of new machines which we need also. The implement industry tells us that the production and sales of farm machinery parts has this year been so much greater than normal, two or three times on many items, and yet we are short. We walk into service shops over the state and see tractors and implements piled up waiting for the mechanics to get to them. These aren't always farmers' machines either—some of them have war paint on them, and we are likely to see a military "expediter" in the shop to see to it that the work on the machines under his jurisdiction is not deferred. The shop owner is at his wit's end to get good mechanics. The net result is that at no time has there been so much need for preventive maintenance of farm equipment, and for anticipation of necessary parts and repair services well in advance of the time the equipment must be at work.



52

J. P. Fairbank

TRACTOR SHORTAGE INCREASES IMPORTANCE OF MAINTENANCE

The number one shortage in California agriculture is crawler tractors. It speaks well for the users, the service shops, and the makers that so many old track-layers have been kept in service in spite of the parts and labor situation. Impending trouble with track tractors generally can be forseen and prepared for in regard to cylinder liners, piston rings, and fuel injection, and by knowing the approximate hours of operation. Failure of bearings, gears and shafts, on the other hand, cannot be anticipated with much assurance; we can only operate the tractors with reasonable care, watch the lubrication and adjustments, and hope these critical parts don't fail. It's hard to believe,

(Continued on next page)

MACHINERY *(Continued from preceding page)*

but service men tell me that tractors still come into the shops with "dry" gear cases and grease reservoirs. It's interesting to see to what length some of the service shops have gone to reclaim parts which were formerly discarded and replaced by new ones. Track rollers and drive sprockets are built up by welding and grinding; flat crank pins and main journals are built up by a "metalization" process, and precision ground to original size—repair methods which had only limited use before the war. On my rambles over the state I notice more track presses and injection system test sets appearing in shops, but the jobs are waiting for them to do. It all goes to show the necessity of being forehanded in arranging for overhauls.

LINK CHAINS AND PROBLEM OF OILING AND WEAR

Detachable link chain is now something of a problem. An executive of the War Production Board recently said that the chain factories are about ten months behind their orders, with an increasing demand for this "farmers' standard power transmission." So we have to make chain and sprockets last as well as we can. This brings up the old controversy "to oil or not to oil." Personally I am for the oiling of chains except under the somewhat limited conditions wherein chain is actually working in soil, or in areas where the dust is very abrasive, as in some parts of the south San Joaquin Valley. The University of California has made no detailed investigation of chain maintenance, but here is what an assistant chief engineer of one of the large chain manufacturers told the farm machinery engineers: "One question frequently asked is whether chains should be operated with or without oil when operating under extremely abrasive conditions, such as sandy soil. From our analysis of field conditions, we believe it is best to start the chains in operation thoroughly lubricated. This can either be done in the field or before your equipment is shipped, by operating it lubricated but idle, for six or seven hours. With the preliminary operation with lubrication, the chain joints will wear down to a smooth bearing without the danger of galling. Without the aid of a lubricant, there is a tendency at times for the load to become concentrated on irregularities in the joints, which causes a galling and rapid wear of the joints. With lubricants, this seizing tendency is eliminated.

"The initial lubricant seems to prevent the entrance of grit to the joint surfaces. After the initial lubricant is dissipated, we feel that further lubrication under gritty conditions will only carry the grit to the joint surfaces, and lapping will commence, producing rapid wear.

"We recommend that as soon as the chains have worn in to a good bearing, they be removed and thoroughly cleansed by soaking in kerosene. Then the operation of the chains without lubrication gives the most satisfactory service." *(Note: this is for extremely abrasive conditions only)*

REPLACE WORN SPROCKETS

Some folks tell me that they are now finding it easier to get sprockets than new chain. In that case, it seems to me the old worn and "hooked" sprockets should be replaced before they tear up any more good chain, even if the old sprockets still have teeth on them. The hooks which develop on old sprockets can be ground off, which helps, of course, but if there are hooks it means that the sprocket is worn out of pitch and will be hard on the chain even if the hooks are removed.

The use of "hard facing" on cutting edges and surfaces subjected to rapid wear is increasing, and rightly so in these times of difficult replacements, even though the cost of applying the hard-facing might approach the price of a new part. The other day I asked a farmer in Kern County how long a beet wing would last. "About half a day ordinarily, and four or five days if hard-faced." "But," he says, "my mechanic knows how to apply it." My conclusion is that a major reason why California farmers have been able to increase production on the whole, despite less new machinery, is because we have mechanics who know how.

EDITOR'S NOTE: The John Deere Company has published an excellent booklet "How to Keep Your Farm Equipment in the Fight" that can be secured from local dealers and is a guide to protecting farm equipment.

CONTROLLING WEEDS ON RIDGES

53

J. N. Fulmor of Dixon has developed a set of discs, which he has used successfully to control weeds growing on ridges before shaping them for planting. The discs can be set to cultivate the ridges deep enough to kill the weeds and at the same time the ridges are reshaped.

54

The discs are mounted on a heavy tool bar operated by a hydraulic lift. A regular wheel tractor can easily pull the load.

On beds listed up dry in the fall (even on land previously in barley) the discs easily control the volunteer growth. By going over the beds two or three times during the winter and early spring the field is well rid of weeds at planting time.

ROTATION INFLUENCES BEET YIELDS

By B. A. MADSON, *Professor of Agronomy and Agronomist In the Experiment Station, Davis, California*

When any crop is grown continuously on the same land year after year, the yield usually declines to a point near or below that which is necessary to cover the cost of production. Sugar beets are no exception to this rule. In fact, under some conditions, the decrease in the yield of sugar beets will occur sooner and to a greater extent than with many other crops. When the yields start to go down, it may be possible to maintain them in part by better cultural methods and by fertilizer. It is usually not possible, however, to maintain them at the level obtained when the crop is first grown by such treatment alone. Experience in all the older beet growing sections, on the other hand, has shown that yields can usually be maintained and often increased by the use of a suitable rotation.

The effect of continuous cropping and the effect of rotation is well illustrated by an occurrence in Southern California, which was called to the writer's attention some years ago. A tract of land of considerable size had been cropped to beets continuously for about ten years. In the beginning, yields of 18 to 20 tons per acre were the rule; at the end of the period the average yield was down to less than 10 tons—too low to be profitable. The field was then seeded to sweet clover and pastured for two seasons. Following the pasture period, the field was again planted to beets and yields of around 20 tons were again obtained.

The reasons for the decline in yield under continuous cropping is not known—at least not all of them. We do know that when one crop is grown year after year, the field usually becomes very foul with certain types of weeds which compete with the crop and become increasingly difficult to keep in check. In the Davis-Woodland area, for example, watergrass has become a serious pest. Many of the older beet fields at harvest time look more like a hay field than a beet field. The heavy growth of grass cannot but help to reduce yields and increase the difficulty and expense of harvesting. Watergrass thrives under the conditions provided by beets. It comes up after the last cultivation, and is stimulated by the repeated irrigation. The only practical method of eradicating it is by rotating with crops which will provide a less favorable association for its growth and which will permit its elimination.

It is also known that under continuous cropping, diseases frequently develop to the point where this crop may be completely destroyed. This is especially true where the causative organism is soil borne. The most effective and often the only practical means of keeping such diseases in check is by rotating with non-host crops. A good example of such diseases is in the Southern Sclerotium Rot, which has occurred in many sections of the state. (See, "Root Rot Diseases of Sugar Beets" by Dr. L. D. Leach—in Spreckels Sugar Beet Bulletin, February, 1941).

ROTATION MAINTAINS FERTILITY

Another reason for rotation is to maintain fertility and keep the soil in good physical condition. The growing of a crop, which requires as much tillage as does the sugar beet, is very apt to put the soil in a poor physical condition. Further, since it is a cultivated, summer-irrigated crop, conditions are provided which are especially favorable for the rapid destruction of the organic matter. With the loss of organic matter, the soil puddles and gets out of condition more easily, and the supply of available nitrogen is reduced. However, even if a field is kept free from weeds, and no known diseases are present, and the soil is maintained in good tilth, yield will still go down if one crop is grown continuously.

Any one crop grown on the land year after year, appears to create in the soil a condition toxic to itself. While no toxic substance which will account for the reduction in yield has been isolated, the condition is well recognized and is characteristic to a greater or lesser degree in all crops. With some crops the effect is more pronounced than with beets. In the East it is not uncommon to hear farmers speak of land as being "clover sick" or "bean sick", meaning that the land will no longer grow a successful crop of clover or beans.

55

Alfalfa sod plowed late in the fall. Note troublesome surviving plants on the left. Deep plowing of the third crop of alfalfa as a green manure, or crowning and replowing if a green-manure crop is not being plowed under, completely kills such plants, as is shown on the right.

Photograph from Farmers' Bulletin, No. 1903, U.S.D.A.

With beets, this condition can often be partially corrected by better farming methods, and a liberal use of fertilizer; but in the long run yield can rarely be maintained by such means alone. A change of crop for a few years, on the other hand, will often make possible maximum yields without any other treatment.

Now then, we may ask what constitutes a good rotation. It has been said that the ideal rotation should consist of a row crop, such as beets, a close drilled crop, and a sod crop, preferably a legume. In California such a combination is not always possible, and may not be desirable. Any sequence of crops may be considered a rotation, though some combinations are naturally better than others. In any case, it must be made up of a crop adapted to the region, and of crops the return from which will justify their production. In some locations such a combination as beets and beans, with an occasional cover crop to help maintain the organic matter, may be adequate. Where the Southern Sclerotium Rot is prevalent, however, this combination would not do as the beans are a host to this disease as well as the sugar beets. Combination of crops such as beets, tomatoes, or other vegetables, whose cultural requirements are similar to beets, while better than no rotation at all, do not provide all of the benefits of a good rotation.

(Continued on next page)

ROTATION *(Continued from preceding page)*

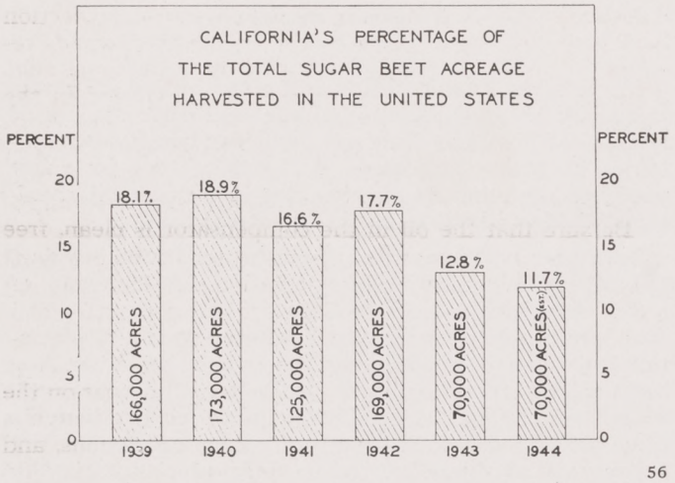
ALFALFA IS GOOD CHOICE

Undoubtedly the best crop to use in a beet rotation is alfalfa. Its deep rooting habit opens up the soil, stimulates aeration and water penetration. It adds nitrogen, and when plowed under, helps maintain the organic matter content. Being a non-cultivated crop, it give the soil a chance to become readjusted from the injurious effects of frequent tillage. Further, it is a crop which will produce a good monetary return, whether sold for cash or fed to livestock on the ranch. A good rotation then, would be alfalfa 4 years, beets 2 years, and one year of some other cash crop or feed crop, depending on the system of farming. Such a rotation may not look too attractive to the farmer who is mainly interested in growing beets. It is the type of a rotation which experience has shown to be necessary to assure the maximum returns from the land. The establishment of a rotation of this character obviously means a diversified type of farming essential to prominence in any region.

BEET ACREAGE HISTORY IMPORTANT

By HUGH F. MELVIN
District Manager, Sacramento District
Spreckels Sugar Company

During the years 1939 to 1942, inclusive, growers in California harvested an average of 17.8 percent of all the sugar beet acreage harvested in the United States. California's percentage dropped to 12.8 per cent of the United States total in 1943, and on the basis of present estimates, its percentage in 1944 will be even lower than in 1943.



56

In view of the great need for sugar by the Allied Nations, the probable continued unavailability of Java and the Philippines as major sugar supply areas, and the disruption of sugar beet production in Europe, there obviously will be no governmental sugar beet acreage limitations in 1945. On the contrary, the War Food Admintration is asking for a large increase in acreage for 1945 and to assist in obtaining the increase it has announced a 1945 price support program at least as favorable as that in effect for 1944.

FUTURE SUGAR SUPPLIES UNKNOWN

It is difficult to predict with any accuracy what the supply situation may be in 1946 or 1947. Sugar from the 1946 California beet crop will not be available for consumption until August 1946, almost two years hence. With an early ending of the war, greatly increased world supplies could become available by late 1946, and, to the extent that sugar is used in war material (munitions, synthetic rubber, alcohol, etc.), the demand would be reduced. Thus, in the event of a large sugar beet crop in the United States as a whole in 1945, there is a possibility that the Government might limit sugar beet acreage as early as 1946. Certainly, action of this kind is not at all unlikely by 1947.

PROTECTION FOR THE FUTURE

Most growers will agree that only a few years ago returns from sugar beets were relatively better than returns from other crops. We all can remember the years when California's allotment was reduced more than other states because it lacked "history," and the days when many growers were told "Sorry, but that's all the allotment you are entitled to on the basis of your recent sugar beet acreage history."

The complete or nearly complete mechanization of sugar beet production is now almost a certainty. With more complete mechanization there could be an even greater desire on the part of the growers to produce sugar beets in the immediate future than in previous years. Creating an acreage history by growing beets now should be one of the considerations given by growers in determining their 1945 cropping program.

MISCELLANY . . .

This Issue: Guy Manuel and Harry Venning, from the Sacramento Agricultural District, arranged for the material for this issue of the Beet Bulletin.

Agricultural Operations: Probably most readers of the Bulletin have learned before this that the Spreckels Sugar Company has extended its operations in the San Joaquin Valley to Kern County and will contract for beets in this territory for the 1945 crop. Ward C. Waterman, Agricultural Superintendent, is now in charge of this southern area. The Spreckels Sugar Company has opened offices in Bakersfield — 460-462 Haberfelde Building, which is located across the street from the El Tejon Hotel. The telephone number is Bakersfield 2727-9.

Government Program: The Federal Register of August 19, 1944, carried the following notice signed by Fred M. Vinson, Economic Stabilization Director, regarding the 1945 sugar beet price support program:

> *"Subsidy Payments:* The War Food Administrator has by letter dated August 2, 1944, requested my approval of proposed 1945 price-support programs with respect to sugar beets and continental sugarcane. These programs, by providing producers a return substantially above the return afforded by present sugar market prices, are designed to increase and maintain domestic sugar production.
>
> "Pursuant to the authority vested in me as Economic Stabilization Director, the War Food Administration is hereby authorized and directed to carry out the proposed 1945 sugar beet and continental sugarcane price-support programs, as described in the War Food Administrator's letter and the memorandum enclosed therewith.
>
> "Dated this third day of August, 1944."

J. E. Coke
General Agriculturist

EARLY PLANTING IN THE DELTA

By DAN BURR, *Agricultural Department, Spreckels Sugar Company*

During the past several years, growers in the delta region have had a tendency to overlook sometimes the advantages of early planting—January and February. There are a number of advantages that often lead to increased yields, and most important, greater assurance that an adequate stand will be obtained from the first planting.

Planting early, when soil moisture conditions are good, makes germination more certain and also lessens the risk of losing the stand from "damping off," water mold, wireworms, centipedes, garden nematode and wind damage. The fungus diseases "damping off" and water mold are not active at soil temperatures usually prevailing in February and March. Wireworms and centipedes are also not active in soils having low temperatures. By planting early, before the soil temperatures rise, the beets become established, and are better able to withstand adversities that usually develop later in the year.

Past records show that the average yields of early planted beets have been larger and sugar percentage higher than later plantings, except in years with unusually high rainfall. Growers, who take advantage of the breaks in weather through January and February and plant their beets, are also ahead on their other crops as they avoid the rush of getting everything planted at once later in the spring.

Weed control is probably the most serious problem that confronts growers who plant early. However, by timely and careful cultivation most weeds can be eliminated and any extra hoeing costs are more than offset by assurance of a good stand of beets.

FIELD NOTES . . .

ORDERS FOR COMMERCIAL FERTILIZER SHOULD BE PLACED NOW TO INSURE DELIVERY FOR NEXT YEAR'S CROPS.

APPLY RUST PREVENTIVES TO EXPOSED FARM EQUIPMENT. RUST CAUSES MORE DETERIORATION THAN NORMAL FIELD WEAR.

DRAIN DITCHES AND LEVEES CAN BE MORE EASILY REPAIRED BEFORE THE WINTER RAINS START. GOOD DRAINAGE IS AN IMPORTANT PART OF THE FARMING PROGRAM.

FALL LAND PREPARATION LEADS TO INCREASED YIELDS AND ALLOWS TIMELY SPRING PLANTING.

WEEDS ALONG FENCES, BUILDINGS AND IN THE FIELD ARE BREEDING PLACES FOR INSECTS. NOW IS A GOOD TIME TO STOP NEXT YEAR'S INSECT DAMAGE.

IRRIGATION EQUIPMENT *(Continued from page 31)*

degrees Fahrenheit on the frame. The motor may be uncomfortably hot to one's hand yet a safe operating temperature. In summer the motor should be protected from the direct rays of the sun, and ample ventilating air provided. If the pump house has only a door, cut some openings in the walls so that the prevailing winds can blow through the house and carry away the hot air.

It requires very little attention to keep motor bearings properly lubricated and yet they are often neglected. Motor repair shops report that 85 per cent of all motor breakdowns are caused by faulty lubrication. Ball-bearing motors usually require grease or oil (see manufacturer's specifications) only once or twice a year, but it is very important that they are lubricated thoroughly with only the proper lubricant. If your motor is grease-lubricated with grease cups, don't let unauthorized people screw those cups down. Do it yourself once every six months, or better still, change them for patent grease fittings and use your grease gun yourself at six-month intervals. Ordinary cup greases many not lubricate the bearings sufficiently to prevent excessive wear. Use a recommended grade of grease. Plain bearings with ring or wick oilers must be kept filled to proper level with a good grade of light motor oil, and should be carefully cleaned once or twice a year. Don't use crankcase oil as it will cause heating and undue bearing wear.

If your motor is a single-phase motor with brushes, have the commutation checked by an electrician before the season starts. Better buy a set of spare brushes, they may not be available when you really need them.

MOTOR CONTROL

It should be understood that an entrance switch is not proper motor control. Its function is to serve as a disconnecting means and its fuses protect the wiring against short-circuits only. Fuses will not protect a motor against overload—a fact which is not generally recognized. The importance of adequate control cannot be overemphasized from the standpoint of safety both to equipment and to operator. Maintenance of electric motors and control is simple and they require but infrequent care. The entrance switch fuses should be of proper size for the motor and no substitutes should be used in place of fuses. Keep a supply of proper size fuses on hand at all times.

Pull the main switch before doing any work on motor, switches, etc. Contacts in the control devices should be inspected every six months and replaced when badly worn. They should not be filed as a natural film forms on the contacts which is more resistant to action of electric arcs than the clean metal. Badly worn contact points may cause an expensive burnout. Proper overload protection should be provided for each motor. It is the owner's responsibility to provide proper motor overload protection. The thermal relay type is most frequently used in the magnetic starters and is recommended in preference to replaceable links. Care must be used to select the proper size overload relay. Don't use too large a relay setting. Usually about 25 per cent continuous overload is ample.

Be sure that the oil in the compensator is clean, free from water and dirt. If it is not, change it, using a good quality insulating oil. Don't put old crankcase oil in the compensator tank.

Use the stop button on your compensator or contactor for stopping the motor. Don't pull the main switch while the motor is running. This will save wear and tear on the switch blades and parts. If the copper on your switch is quite black and pitted, check for loose connections, and if the part is supposed to have some spring in it, see that overheating hasn't weakened the spring. If overheating has occurred, have the switch overhauled. *Warning*—the top of the switch is hot (has electricity in it); keep away from it.

When in doubt consult your electrician.

BELTS

To attain the maximum power transmission with belts with the least expense and lost time, the following rules are suggested: (1) Use a fairly long belt so that its weight will make it hug the pulleys with the belt fairly slack. (2) Have smooth side of the belt next to the pulleys, as

(Continued on next page)

IRRIGATION EQUIPMENT (Continued from preceding page)

this side has greater friction grip than the rough side. (3) Belt tension should be checked periodically. Too tight a belt throws unnecessary load on the bearings and absorbs power. Too loose a belt allows too much slippage. A belt should be slack enough to slip at the instant of motor starting so as not to jolt the driven machine. (4) Belt dressing if used at all should be used sparingly. (5) Never allow grease or oil to get on the belt. (6) A belt should not be left in tension or exposed to the weather. (7) Keep direct sunshine and rain away from your belts. (8) V-belts make fine belt drives, especially for short-center drives, and should last indefinitely if given reasonable care and kept free from grease and oil.

CONCRETE PIPE LINES

(1) Keep pipe lines clean. (2) Exercise care in filling pipe lines where dead water exists to avoid excessive pressure due to trapped air. (3) To avoid excessive pressures and possible blowouts, valves should be closed gradually. (4) Keep all valves well oiled to make them operate easily and also prevent rust.

PUMPS—HORIZONTAL CENTRIFUGALS

The packing gland requires periodic attention. It should never be drawn up with heavy wrenches, as only light pressure should be exerted on the nuts. When unnecessarily tight, much extra power is consumed; the shaft or sleeve may become scored, and it may run hot if grease only is used for a seal. When the gland still leaks with moderate tightening, take out all the old and install new packing of proper size and character. When a shaft or sleeve become rough from rust or from sand carried in the water, or from improper tightening of the gland, a packing gland will not stay in good order for very long. The same is true if the shaft is not straight, or if the bearings are worn. In an emergency a water seal may be added to the gland to prevent air leaking in, but water containing sand should not be used. Pumps equipped with sleeve bearings should use a lubricating oil having a viscosity of about S.A.E. 20 or 30. Ball-bearings for speeds less than 1800 R.P.M. should be packed with a soft grease unless designed for oil. Dust and grit are potent enemies of bearings. Oil vents are provided with dust caps which not only should be kept closed but clean, so that dirt will not fall into the bearings when the cap is opened.

SOME CENTRIFUGAL PUMP "IF'S"

If after starting the pump it throws a little water at the first few revolutions and then churns and fails to discharge more, it is evident that the air was not all out of the pump and pipes, or the suction lift too great, or a leaky pipe, or a long suction and insufficient discharge head. If when first started the pump throws a full stream for a few minutes and then fails, it is caused by failure of supply, or water receding in the well below the suction limit. The remedy for this is to lower the pump, thus reducing the suction lift. If the pump delivers a full stream of water at the surface or level of the pump but fails to pump at a higher discharge point, the speed of the pump is too low. If the pump starts a full stream and then the discharge decreases very slowly until the pump fails to deliver any water, it is caused by an air leak at the packing gland. If the pump delivers a full quantity for a few hours and fails, the speed and water supply being unchanged, the suction pipe or impeller is obstructed. If when running there is a heavy vibration, the shaft has been sprung, the pump is out of alignment, or an obstruction has lodged in one side of the impeller. If the bearings heat unduly, the belt is unnecessarily tight, the bearings lack oil, or there is an end thrust. The last "if" is that if the pump is properly installed and operating, it will positively operate successfully as the centrifugal is the most simple water-lifting device manufactured.

VERTICAL CENTRIFUGAL

Shaft bearings are best lubricated through small pipes by drip oilers at the ground surface, one for each bearing. This is not only the safest method but the surest one, because the oil supply is conveniently regulated. The thrust bearing should have a dust-tight cover.

DEEP-WELL TURBINE

Since specific instructions on lubrication usually accompany the installation, they should be followed precisely. Substitution of oils is dangerous. Oil for the shaft bearings should be thin. Use either dynamo oil or nothing heavier than S.A.E. 10. Do not use old automobile oil. The rate of drip to the shaft bearing should be carefully watched, as too much oil increases power consumption. It is good practice to flush out the oil lines once a year with kerosene or some other cutting fluid. On grease-packed pumps care should be exercised not to force too much grease into the line. Once or twice a season is sufficient.

SOME TURBINE PUMP "IF'S"

If you hear a clicking noise and it sounds as if it might be a motor bearing, it is probably a bad bearing in the line shaft. If the pump is oil-lubricated and water starts flowing from this gland, you'd better see your pump man about it. If the pump is water-lubricated, the leakage should be stopped by tightening the gland; if this is unsuccessful, better repack the gland, using a recommended packing material, then keep it lubricated—that's what the grease cup is for. If it is necessary to change the direction of the pump discharge, be sure the pump hangs free in the well, otherwise the shaft whips, causing vibration and eventually bad shaft bearings.

All turbine pumps should have periodic inspections by a competent pump man. If repair work is necessary, it should be done if possible during the off-season.

THE GROUND SQUIRREL PROBLEM IN CALIFORNIA

S. E. PIPER, *District Supervisor of Rodent and Weed Control, and* W. C. JACOBSEN, *Chief, Division of Plant Industry, State Department of Agriculture, Sacramento*

Present day necessity and effort to suppress ground squirrels is a heritage from the preceding century. This group of animals under discussion includes the most aggresive and wily of the field rodents and under frequent circumstances becomes as undesirable as its urban cousin, the common rat. The natural and acquired abilities of the ground squirrels to thrive and prosper in the face of advancing human civilization continues them as an important economic and health menace, requiring the exercise of continuing control procedures and challenging human ingenuity to develop constantly improving techniques to suppress them.

"DIGGER" SQUIRRELS

According to the systematists, there are at least twenty different kinds of ground squirrels inhabiting the various regions of California, each kind filling its particular area of abode, limited by climatic bounds and types of food available. For practical purposes, we are here mainly

SQUIRREL PROBLEM

(Continued from preceding page)

concerned with those which are destructive to range and pasture, field and truck crops, fruit and nut trees and their products or which damage agricultural structures; hence, our primary concern is with the so-called "Digger" squirrels (Beecheyi group), represented by six different species distributed more or less generally throughout the State with maximum populations in the interior valleys and their foothills and in the south central coast counties, and the "Picket-pin" type (Oregon group) represented by two species in northeastern California.

While the earliest records report damage to grain and forage, the building of canals, even in the mining days before the days of extensive irrigation works, brought reports of loss of water and weakening of embankments; a transferance to man-made structures of their burrowing habit, which had made them an important factor in extensive soil erosion.

The many ways in which ground squirrels can cause damage is largely common knowledge. However, in 1918 it was estimated that agricultural losses occasioned had approached at least $30,000,000 annually. This was at the beginning of the intensive program of ground squirrel suppression undertaken by the County Agricultural Commissioners and the State Department of Agriculture (then the State Commission of Horticulture). The greatest effectiveness in this continuous program appears to have been reached about 1938 or 1939, when the damage was estimated to approach $6,000,000. With the beginning of the war in Europe, the volume of certain control materials was cut down and, as the many nations became engaged in World War II, several of these became scarce or high priced which, coupled with the reduction in available labor at a reasonable cost, the full effectiveness of ground squirrel control which had been gained began to show signs of tapering off.

In 1944 we find some areas in the State showing a greater ground squirrel population than at any time since 1918. With the increased value of farm crops and products, the probable increase in damage could be placed at double the low point above noted. Too, it must be borne in mind that ground squirrels have enormous "comeback" powers. So long as an adequate food supply is available, their annual litters will average about eight young per pair; hence, a very few years inattention by growers to necessary control work will bring new centers from which clean areas can be again populated. Fortunately, the areas where the increases in ground squirrels have become most apparent have been on range and pasture lands, where losses of foragge, though undesirable, are not so apt to be noticed as in planted areas, where real effort has been continued to keep damage to a minimum.

57

A typical example of the California Ground Squirrel, the rodent of chief economic importance in the state. Note the tall, rather, pointed ears, the whitish eyelids, the grizzled-white shoulder patch, the mottled back and rump, and the bushy tail.

Incidentally, every one of the official agencies involved has endeavored to forestall any slackening in control measures in districts where field rodents harbor diseases transmissible to humans, notably bubonic plague. During the range of years (1918-1939) noted for intensive control programs, there was an average of ten million acres treated annually at an average cost for all agencies, including landowners, of about a half million dollars. The programs of the County Agricultural Commissioners were generally so arranged that an appreciable portion of the acreage was not of a repeat character in order to gain maximum effectiveness for the materials used. Some rotations of the programs called for a treatment of some districts each year; others every other year, depending upon difficulty of control, status of activity of the ground squirrels, and availability of natural foods. It must be borne in mind that there have always been some particular areas where resistance to ordinary control methods has required repeated attention. This is indicative of the need for thoroughly competent field operators who understand the influence of natural feeds, climatic conditions, etc., which induce the extraordinary circumstances.

Intensive control measures undertaken in 1918 were based upon the well-know Biological Survey strychnined whole barley formula evolved by the senior author after a careful study of the life history and habits of the ground squirrels starting in 1910. Utilization of this formula during the dry season, followed by fumigation with carbon bisulphide in winter and spring, became the routine procedure adopted by the agriculture officers to whom ground squirrel control work had been delegated by the 1917 Legislature. The above schedule proved to make impressive headway against the mounting squirrel population, and even today remains the basic schedule to which has been added certain auxiliary and supplemental methods to meet various seasonal requirements. The theory upon which the strychnine coated barley proved to operate was based upon a knowledge of the physical structure and food habits of the Digger squirrels.

In the spring of the year, this group feeds upon green forage and crop plants, but, as soon as the seeds of the various crops, especially grains, native grass, and other range plants, become available, these animals turn to this type of food for immediate use and especially for caching and storing. The fact that these animals have a cheek pouch capable of carrying appreciable quantities of grain. up to 500 kernels per animal, gave a clue as to one of the most successful means of poisoning. Strychnine coated grain was found to release the poison for absorption through the membraneous lining of these pouches requiring about 1/5 as much strychnine to be lethal as compared to that necessary to kill when used as a stomach poison. Various of the green feeds available to squirrels after the start of the rainy season were found to be more acceptable, as a result the pouching practice ceased. This led to a recognition of the necessity to find some other poison which would be effective at this season of the year if the gains made were to be retained.

In 1926 thallium sulphate was introduced from Europe. This material was first used extensively in California against field rodents after trials proved it to be effective during the late fall, winter, and spring months as a relatively economical stomach poison and a suitable supplement to the strychnine coated grain method. It could be used as one of the cheaper grain bait methods to help reduce ground squirrel numbers before resorting to fumigants, especially carbon bisulphide, carbon monoxide (motor vehicle exhaust gases used in special instances, e.g., in hollow trees, orchards, and vineyards), and the more recently developed methyl bromide. Carbon bisulphide had been a fumigant of long standing value, having been introduced as a recommended control means as early as 1878. Its cost, when used as a primary method, had been a deterrent but when utilized after the grain bait poisons had thinned out the population it became part of a standard practice. Improvement in mechanical applicators has increased the effectiveness of this material, both in delivery into squirrel burrows and in economy.

Another very effective fumigant diverted to rodent control uses in recent years has been methyl bromide and, while costlier than carbon bisulphide, was found to be valuable not only in destroying ground squirrels but also in killing the insect vectors harbored on them and which were capable of transmitting their diseases. The use of this material so far has been confined largely to final clean-up work on plague areas.

World War II brought the problems attending shortages of valuable pest control materials to the rodent control field. Strychnine became scarce; thallium sulphate sources in Europe were cut off, leaving only limited domestic supplies to draw upon, and periodic scarcity of containers for carbon bisulphide and methyl bromide, coupled with other wartime demands, delayed deliveries. Other known chemicals which might have been of partial value were in demand for other uses. We looked into the possibilities for zinc phosphide, which had gained some reputation for rat control and for suppressing certain lesser field rodents in the eastern states. Earlier trials in California against ground squirrels had not looked too promising. However, new techniques were attempted for causing this chemical to adhere to the variety of baits and it showed up surprisingly well when freshly mixed, applied sparingly, and in rotation with other items. It has earned a place as another one of the materials to use supplementary to the basic schedule of strychnined barley and carbon bisulphide. This development in itself shows that the hoped for economical, all purpose, lethal material which investigators must continue to seek may yet be found and which may appear through some adjustment of the processes now in use.

Ground squirrel control is far from a mechanical operation. Difficulties, such as poor acceptance, competition from more favored foods, climatic inducements to dormancy, arise to confront even the most expert of the rodent control specialists.

At times, for final clean-up it becomes necessary, because of unfavorable terrain, abundance of natural food, avoiding any possible hazard to livestock or wildlife, to resort to shooting or trapping. Through a modification of the box-type gopher trap, the Deputy Agricultural Commissioner, in charge of rodent control for Los Angeles County, has made a most creditable showing against ground squirrels under difficult conditions by the use of this device.

A natural habit characteristic of Digger ground squirrels to go through non-specific periods of dormancy known as hibernation in winter months and aestivation during certain periods of drought and extremely hot weather is particularly complicating in the control procedure. Methods of control ordinarily recognized as effective are upset by ground squirrels appearing on an apparently well treated area. Obviously, a period of limited or protracted dormancy had intervened.

Ground squirrel control practices become most effective when systematically followed. One feature that has become standard with County Agricultural Commissioners and the State Department of Agriculture staff members has been to prebait with a variety of bait materials in order to determine which of these is being best accepted. Further determination must frequently be made also as to whether or not baits readily accepted in their clean state will prove to be accepted after treated with various poisoning materials. Certain specialized areas seem to give minor response even to the choicest types of treated food. It has been learned to be most important to avoid any unwarranted exposure of poisoned baits again and again on the same areas, since sooner or later not only will the baits currently used be ignored but other baits normally acceptable if properly sequenced will also be by-passed.

The routine of ground squirrel control involves the proper use of any or all of the measures above discussed.

CONTACT AGRICULTURAL COMMISSIONER FOR RECOMMENDATIONS

Rather than recite detailed formulae for the preparation of baits, we respectfully recommend that growers who are anxious to prevent losses to their crops and who wish to keep down the ground squirrel population in their vicinty contact their County Agricultural Com missioner for recommendations as to the best methods and materials to use at the particular season of the year. The State Department of Agriculture, cooperating with the U. S. Fish and Wildlife Service, endeavors to keep these local agricultural officers informed on all new or improved methods.

An arrangement was made early in the program to suppress ground squirrels whereby the County Agricultural Commissioners were authorized by their Boards of Supervisors to furnish control materials at cost. This has proved to be a boon to farmers, since in the past the inability to purchase the most suitable types of baits at the proper seasons of the year had discouraged their best efforts. Furthermore, the County Agricultural Commissioners can guide ground squirrel control work materially by supplying only the proper baits at the right seasons.

In the postwar period we must look to the gathering up of some of the loose ends again, i.e., catch up to the gains previously made through the availability of all useful materials and adequate manpower and its judicious use to conserve crops and protect health without hazarding beneficial wildlife, through the cooperation of landowners, Federal, State, and County agricultural and wildlife agency officers, health departments, and conservationists. This requires the complete resumption of an organized and well-directed program supported by sound and continuing educational and investigational work.

Spreckels Sugar Beet Bulletin

Vol. VIII November-December 1944 No. 6 [pages 39-?]

Not available [missing from collection]

SUGAR BEET DATA

ACREAGE, YIELD AND SUGAR PRODUCED — UNITED STATES AND CALIFORNIA

Year	Acreage Sugar Beets Harvested			Average Yield of Beets per Acre			Production of Refined Beet Sugar		
	U. S. (1,000 Acres)	California (1,000 Acres)	Calif. % of U.S. (Percentage)	U. S. (Tons)	California (Tons)	Calif. % of U.S. (Percentage)	U. S. (100# Bags)	California (100# Bags)	Calif. % of U.S. (Percentage)
1906	376	60	15.96	10.3	11.2	108.74	9,672,240	1,855,000	19
7	371	47	12.67	10.2	10.2	100.00	9,272,560	1,460,000	16
8	365	62	16.99	9.4	10.4	110.64	8,517,680	1,798,000	21
9	420	83	19.76	9.7	10.6	109.28	10,249,380	2,545,000	25
10	398	90	22.61	10.2	Data not available		10,203,440	----------	----
1911	474	99	20.89	10.7	10.4	97.20	11,990,000	3,226,000	27
12	555	111	20.00	10.2	9.0	88.24	13,851,120	3,178,000	23
13	580	128	22.07	10.1	8.9	88.12	14,668,020	3,424,000	23
14	483	104	21.53	11.6	10.4	89.66	14,578,085	3,380,430	23
15	611	123	20.13	10.7	10.2	95.33	17,453,677	3,907,625	22
1916	665	141	21.20	9.4	10.5	111.70	16,420,000	4,727,701	29
17	665	162	24.36	9.0	8.2	91.11	15,209,118	4,157,181	27
18	594	101	17.00	10.0	8.5	85.00	15,220,000	2,456,000	16
19	692	107	15.46	9.3	7.6	81.72	14,520,000	2,623,337	18
20	872	123	14.11	9.8	8.7	88.78	21,650,610	3,359,141	16
1921	815	121	14.85	9.6	8.7	90.63	20,403,313	3,426,041	17
22	530	57	10.75	9.8	7.4	75.51	13,498,900	1,454,103	11
23	657	61	9.28	10.7	9.6	89.72	17,698,001	2,076,127	12
24	816	84	10.29	9.2	9.4	102.17	21,832,807	2,633,213	12
25	648	76	11.73	11.4	6.5	57.02	18,010,887	1,750,221	10
1926	677	46	6.79	10.7	8.0	74.77	17,971,471	1,347,061	8
27	721	59	8.18	10.8	8.1	75.00	21,860,000	1,675,000	8
28	644	49	7.61	11.0	13.0	118.18	21,312,416	2,137,149	10
29	688	46	6.69	10.6	11.8	111.32	20,324,187	1,792,944	9
30	776	65	8.38	11.9	11.8	99.16	24,152,158	2,484,716	10
1931	713	89	12.48	11.1	11.9	107.21	22,959,212	3,327,172	15
32	764	104	13.61	11.9	12.4	104.20	27,003,688	4,258,988	16
33	983	108	10.99	11.2	15.0	133.93	32,826,690	5,418,712	17
34	770	110	14.29	9.8	14.7	150.00	23,169,610	5,417,244	23
35	763	116	15.20	10.4	12.4	119.23	23,578,679	4,776,092	20
1936	776	139	17.91	11.6	14.2	122.41	26,100,393	6,201,616	24
37	755	134	17.75	11.6	12.9	111.21	25,764,446	5,758,873	22
38	930	162	17.42	12.6	13.1	103.97	33,635,555	6,741,870	20
39	917	166	18.10	11.8	16.3	138.14	32,977,648	9,060,265	27
40	916	173	18.89	13.4	16.8	125.37	35,404,207	9,317,154	26
1941	754	125	16.58	13.7	16.0	116.79	29,563,669	6,202,267	21
42	951	169	17.77	12.3	13.8	112.20	32,327,342	7,021,652	22

IN ONE ACRE THERE ARE:

1. 43,560 square feet.
2. 26,136 running feet of row, spaced 20 inches apart.
3. 26,136 beets in rows spaced 20 inches apart and beets thinned to 12 inches (26,136 beets of 1 pound average weight equal 13.0680 tons per acre).
4. 31,363 beets or 15.68 tons of 1-pound beets in 1 acre planted an average of 20 inches apart and thinned 10 inches apart.
5. 39,204 beets or 19.60 tons of 1-pound beets in 1 acre planted an average of 20 inches apart and thinned 8 inches apart.

CROP RECORD 1944

FIELD No. OR NAME	ACRES PLANTED	ACRES THINNED	ACRES HARVESTED	TONS PER ACRE	SUGAR PER CENT	ESTIMATED PAYMENT N.S.P.	ADDITIONAL PAYMENTS

HONEY-DEW